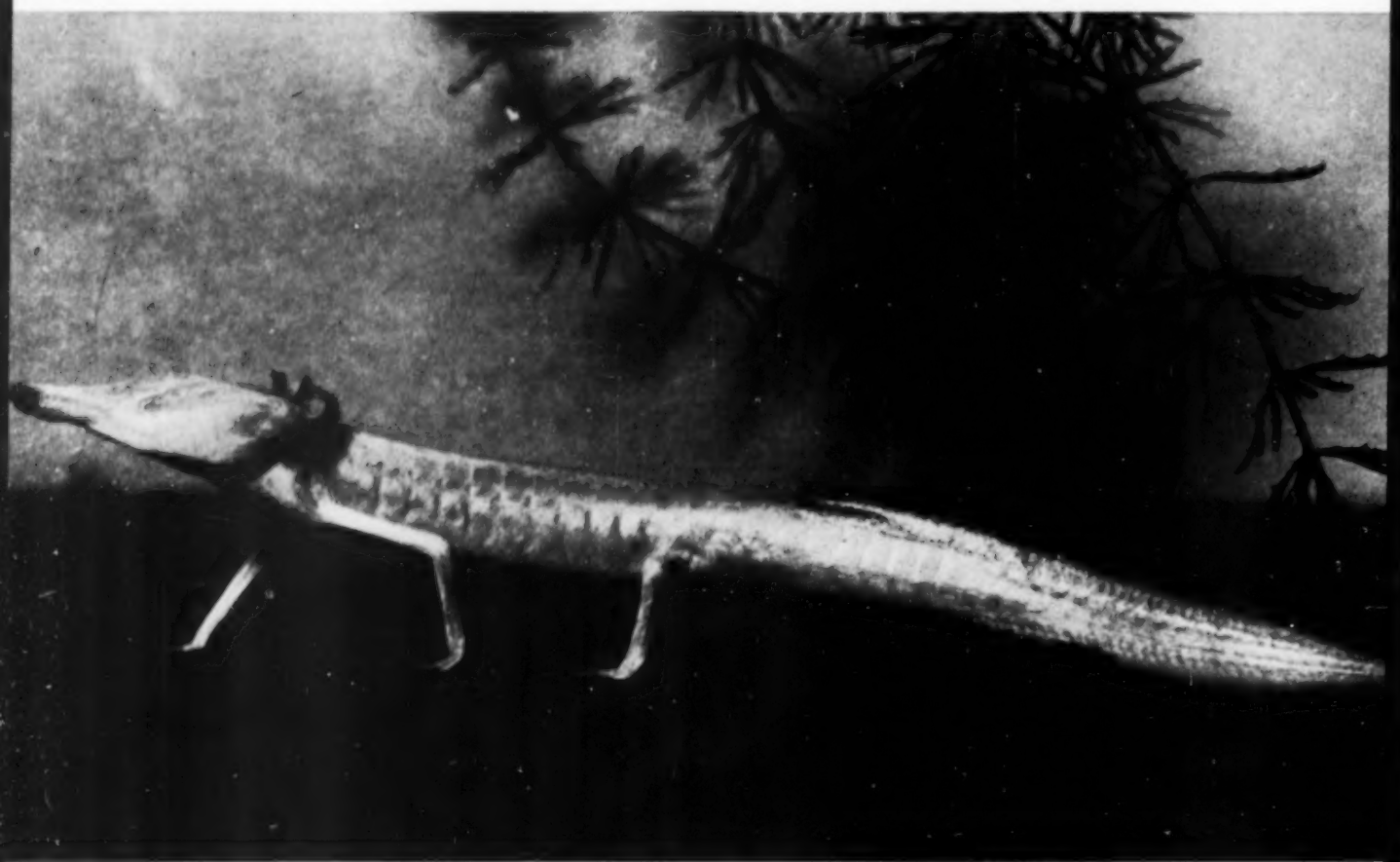
OCTOBER, 1954 Vol. 43, No. 8

# Industrial Arts and Vocational Education

*The Shop Teachers' Professional Magazine*

**SHOP PROJECTS NUMBER**

# BECAUSE IT IS NOT REQUIRED



The responsiveness of living creatures to the demands laid upon them by environment is evidenced at every turn. The cave salamander has rudimentary optic nerves, but because the murky depths of its underground home do not require sight, it does not see. In the physical world this responsiveness is evidenced over an evolutionary cycle. But with the human psyche, the response is almost *immediate*.

In the case of a youngster, because the lines of communication between the adult world and himself may break down, demand may not be felt until the boy's habits and nature have "hardened" and it is too late. The wise educator knows this and he tries to reflect in the immediacy of his classroom the requirements of a world too far away for the youngster to comprehend.

Such an educator asks for good work, for conscientious work. He shows to his boys the vision of the possible and paints it in the colors of the desirable. He weaves a firm fabric of habit within the student and makes sure the fabric is never weakened by any inconsistency on his part. The instructor in mechanical drafting for example never breaks the consistency of *his* aims by encouraging or permitting the use of inferior, shoddy, cheaply made drawing instruments. *He* insists that the best alone is consistent with his teachings.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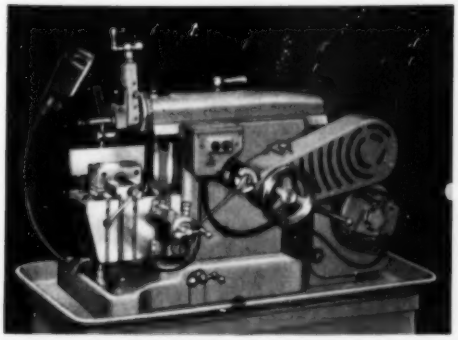
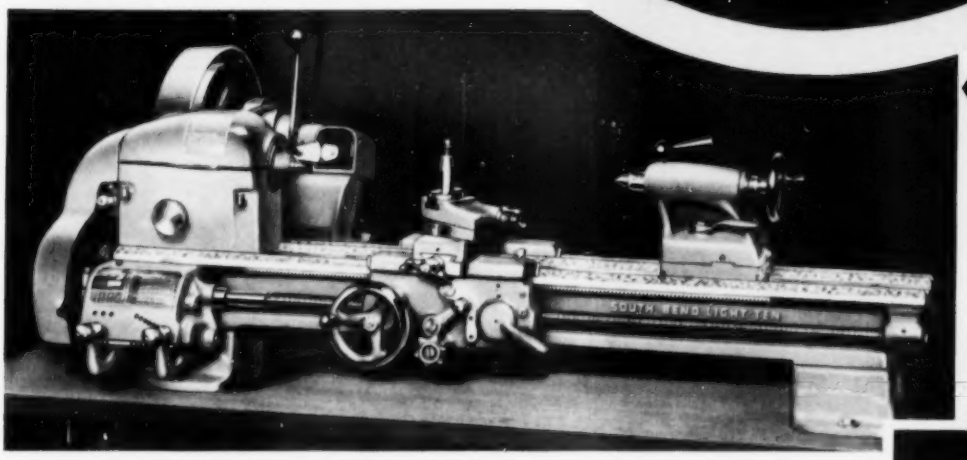


South Bend 7" Precision Bench Shaper — less motor, stand and tool holder; f.o.b. factory — $551.

# Students Learn Faster on South Bends




South Bend Light Ten Model A Bench Lathe —less electrical equipment; f.o.b. factory — $500.

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Time is always at a premium in every shop course — there's always more that should be taught than time permits. Often much time is spent developing machine-handling ability.

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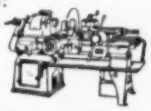

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| Longitudinal Table Travel | 15" | Quill Travel | 3" |
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OCTOBER
1954

VOL. 43 NO. 8

# Industrial Arts and Vocational Education

## The Shop Teachers' Professional Magazine

**Published on the 15th of the month preceding the date of issue by THE BRUCE PUBLISHING CO., 400 North Broadway, Milwaukee 1, Wis. • CENTRAL OFFICE: 20 North Wacker Drive, Chicago 6, Ill. • EASTERN OFFICE: 225 Broadway, New York 7, N. Y.**

★ ★ ★ ★

### Your 1954–55 Address

May we remind you once more that you will probably lose one or more issues of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION unless we have your correct address.

Please send us your new address at once, together with your former address. Please include zone number.

### This Month's Cover

The cover picture of the October, 1954, issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, shows two students at Stayton Union High School, Stayton, Oregon, planishing small copper trays. Students of the beginning general shop spend from 7 to 9 weeks in art metal and jewelry. Nancy Frye and Ronnie Myers are the students shown. Of 115 students in this department, over 30 of them are girls. The class is under the direction of Arthur C. Corbett, industrial-arts instructor.

★ ★ ★ ★

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***Editorial Contributions.*** — The Editor invites contributions bearing upon Industrial Arts, Vocational Education, and related subjects. Manuscripts, drawings, projects, news, etc., should be sent to the Publication Office in Milwaukee. Contributions are paid for upon publication. In all cases manuscripts should be accompanied by full return postage.

***Articles Indexed.*** — The articles contained in the Magazine are regularly indexed in "The Readers' Guide to Periodical Literature," and "Education Index."

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# Association News

## COMING CONVENTIONS

*Oct. 18–22.* National Safety Council, at Hilton, Congress, Morrison, and La Salle Hotels, Chicago, Ill. Secretary, R. L. Forney, 425 N. Michigan Ave., Chicago 11, Ill.

*Oct. 21–22.* Minnesota Vocational Association, at St. Paul Hotel, St. Paul, Minn. Secretary, Clifford Horn, High School, St. Louis Park, Minn.

*Oct. 23–24.* Philadelphia Industrial Arts Association, at Hershey, Pa.

*Nov. 6–7.* Industrial Arts Association of Pennsylvania, at Penn Bedford Hotel, Bedford, Pa. President, J. Philip Young.

*Nov. 11–13.* Mississippi Valley Industrial Arts Conference, at La Salle Hotel, Chicago, Ill. Chairman, Dr. Verne C. Fryklund, president, The Stout Institute, Menomonie, Wis.

Per capita consumption of oil products in this country is approximately 20 times that of the rest of the free world. — *Petroleum Newsnotes.*


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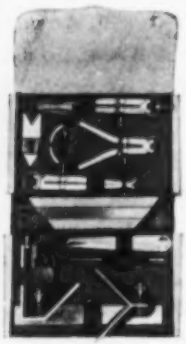

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## NATIONAL SAFETY CONGRESS

The biggest safety show on earth — the annual National Safety Congress and Exposition — will be held in Chicago, Ill., October 18 to 22. More than 12,000 persons from all over the world will hear 600 program participants at 200 sessions discuss the latest advances in accident prevention.

Headquarters for the safety congress will be the Conrad Hilton Hotel.

*National Safety Council, 425 North Michigan Ave., Chicago 11, Ill.*

## N.C.I.A.A. ANNUAL PROJECT FAIR

The North Carolina Industrial Arts Association held its third annual State Project Fair on May 1, at Lindley Junior High School, Greensboro, N. C., and was attended by a large number of people.

Beginning with about 100 projects two years ago, this Fair crowned them all with over 500 projects ranging from the very simplest item to very elaborate carvings and inlays.

The Fair was run under the rules of the Ford Awards with cups and medals used as prizes being donated to the Association by Greensboro Industries. Five silver cups were given for achievement awards and 72 bronze medals were given as division awards.

Rodney Williams, Curry Training School, Woman's College, Greensboro, had the outstanding award winner of the entire fair.

Over 3000 people viewed the exhibit. There was also a luncheon meeting followed by a business meeting and election of officers. The next Fair has been scheduled for Myers Park High School, Charlotte, and will be held the first week in May, 1955.

## TENTH ANNUAL INDUSTRIAL ARTS CLINIC

The Tenth Annual Clinic was held at the University of Oklahoma, Norman, Okla., on May 31 through June 4. The clinic program, conducted by Edwin Walter, Oklahoma City University, continued the craft work started two years ago at the Eighth Annual Clinic.

♦ Dr. M. D. Mobley, executive secretary of the A.V.A., has announced a new group disability insurance program which covers sickness and accident to include hospitalization. Brochures discussing this plan have been sent to all A.V.A. members. For additional information, write to *American Vocational Association, Washington, D. C.*

♦ The Indiana Industrial Arts meeting will be held on October 21, 1954, at Indianapolis, Ind.

# Personal News

## W. CARLISLE ANDERSON RECEIVES Ph.D. DEGREE

W. Carlisle Anderson received his Ph.D. at the University of Minnesota under Dr. Homer J. Smith in June, 1954. The topic of his dissertation was "Student Teaching in Industrial Arts Education."

For the coming year Mr. Anderson will be Associate Professor of Industrial Arts at Northern Illinois State Teachers College, DeKalb, Ill. He will be teaching the woods

(Continued on page 6A)

# Power to make the grade... in training and on the job!

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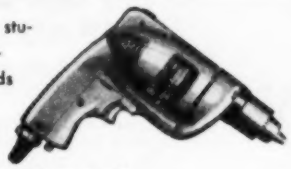
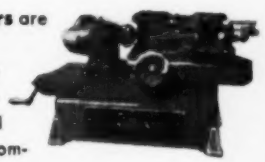


**B&D Valve Refacers** are the finest equipment made for training students to grind factory-accurate angles in all types of internal combustion engine valves.



**B&D Vibro-Centric* Valve Seat Grinders** train students to put mirror finishes on all internal combustion engine valve seats in a few seconds. Easy to operate.

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**B&D Sanders** help you teach many finishing jobs—sanding, grinding, burnishing, cleaning. Drive abrasive discs, saucer grinding wheels, "Whirlwind" wire cup brushes.

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## PERSONAL NEWS

(Continued from page 4A)

area and will be connected with supervision of student teaching.

Mr. Anderson was formerly at the University High School at Minneapolis, Minn.

### J. KELLY MUDD APPOINTED STATE SUPERVISOR OF T AND I

J. Kelly Mudd, extension specialist in supervistory training for the past eight months at the University of Oklahoma, was appointed state supervisor of trade and industrial education for the Oklahoma State Department of Vocational Education, effective June 1.

Prior to his association with the department of business and industrial services of the OU extension division, Mudd spent three years at Capitol Hill high school in Oklahoma City as a day-trade teacher and diversified occupation teacher-co-ordinator.

♦ WELCOME E. WRIGHT, formerly associate professor of industrial education at Agricultural and Mechanical College of Texas, College Station, Tex., has been appointed head of the department of industrial education at East Texas State Teachers College, Commerce, Tex., effective September 1.

Mr. Wright succeeds Professor J. G. Grove, who has retired as head of this department after serving for over thirty years.

♦ DR. HENRY W. KNEPLER, assistant professor of English at Illinois Institute of Technology, was one of the participators in a television production workshop sponsored by the National Association of Educational Broadcasters.

Dr. Knepler was one of 30 educators and educational TV directors to participate in the workshop which was held August 22 to September 11 at Michigan State College, East Lansing, Mich.

♦ LEROY JOYNER, JR., has been appointed vocational agricultural teacher at the Edgewood High School, Van Zandt County, in the Dallas, Tex., area.

♦ Kerry D. Smalla, a senior at the Otsego, Mich., high school, will study industrial arts at Western Michigan College, Kalamazoo, for the next four years under a $500 scholarship awarded him by the Orthopedic Frame Company of Kalamazoo.

The scholarship was granted by Dr. Homer L. Stryker, president of the medical equipment manufacturing firm. The grant was made for the second year as a means of encouraging interest in industrial arts among highly qualified high school students.

Smalla will receive $200 his freshman year and $100 each succeeding year, in addition to having a part-time job with the firm while in college.

♦ William Wilcox, a senior at Western Michigan College from Dundee, Mich., has been cited as the outstanding senior in industrial arts this year. By elimination and vote of the faculty in the department he has been awarded the scholar-craftsman plaque for excellence. Wilcox will teach industrial arts next year at Centreville, Mich. This award was first granted in 1932.

♦ WILLIAM H. COLE retired as apprenticeship supervisor of the Los Angeles schools, at the close of the 1953–54 school year. Mr. Cole, who was born in London, England, entered this country in 1912. He was appren-

(Continued on page 9A)

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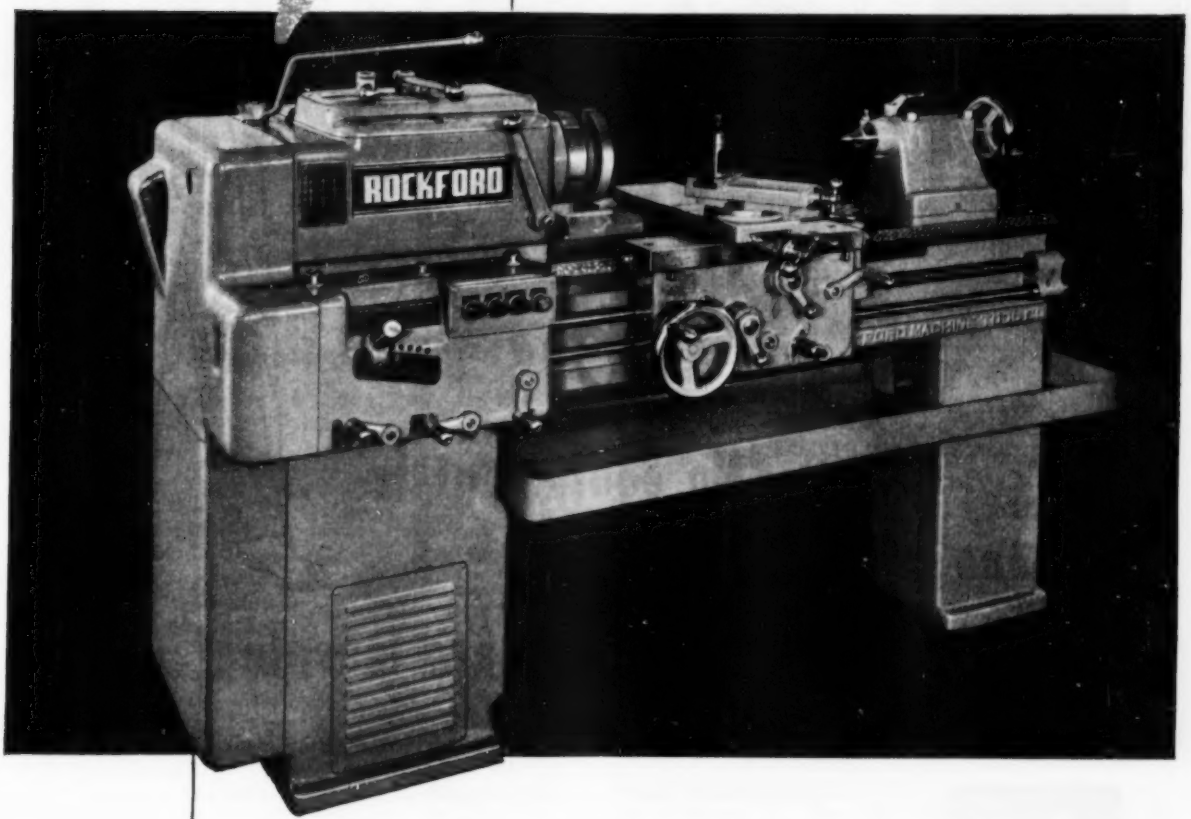


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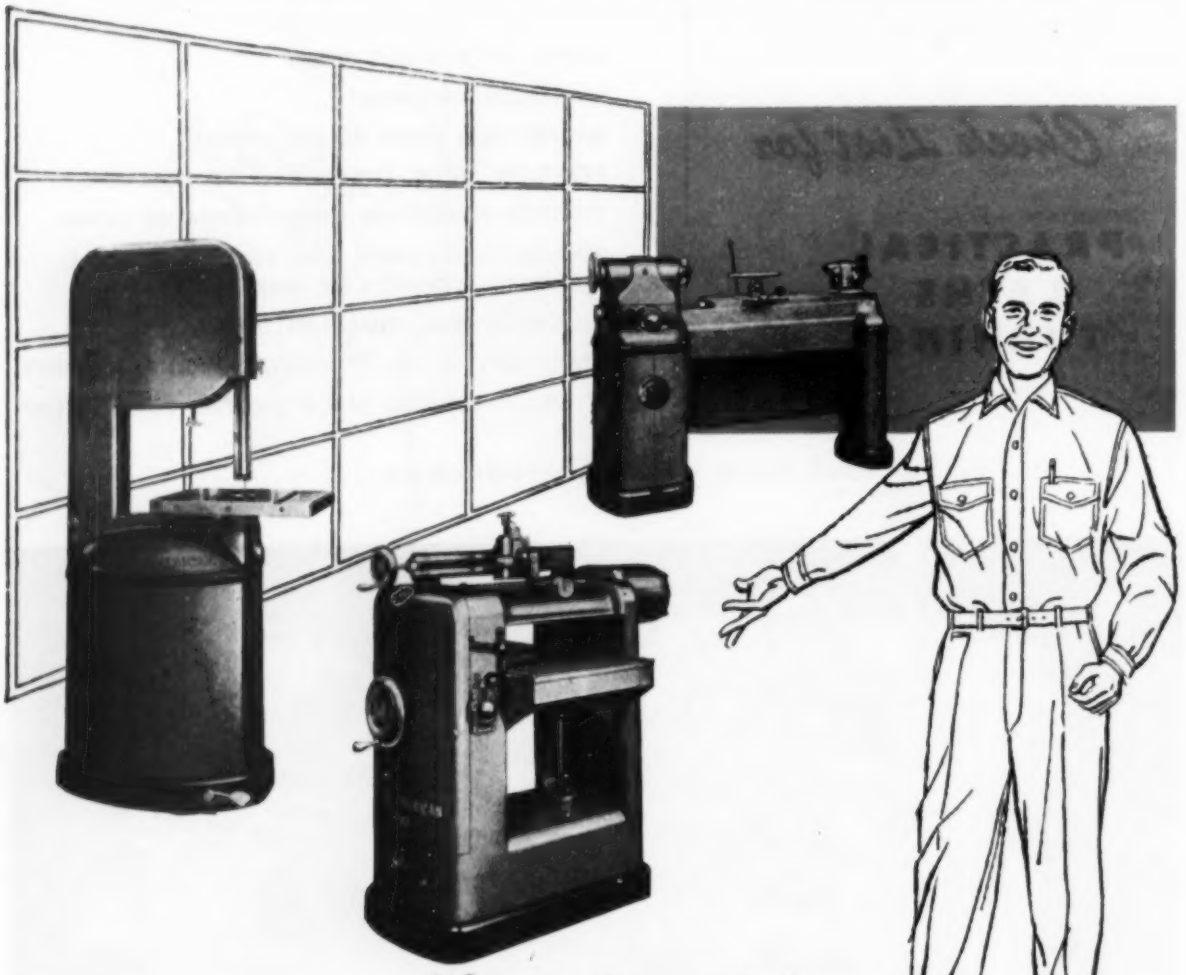

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## PERSONAL NEWS

(Continued from page 6A)

ticed to the plastering trade in November of the same year and completed his indenture in 1916.

He is a veteran of World War I (1917–19). After the war he returned to his trade and worked as a journeyman plasterer until January, 1928, when he was assigned as an instructor at the old Frank Wiggins Trade School. In 1940 he was appointed head of the Building Trades Department at Frank Wiggins.

He served as apprenticeship supervisor since February, 1942. He is recognized nationally as an authority on apprenticeship education, and as a master teacher-tradesman.

♦ LESLIE A. KOCH, vocational instructor at George Washington High School, Agana, Guam, M. I., has been awarded a Ford Fellowship totaling $7,100 for the school year 1954–55.

Under the grant for the advancement of education, Koch will spend four months in the Virgin Islands and four months in Puerto Rico where he will study language problems, cultural influences, methods of instruction, federal aid programs, and guidance and counseling.

♦ HOWARD H. GERRISH was appointed to instructor of vocational education and practical arts, at the School of Education, University of Michigan, Ann Arbor, Mich.

Mr. Gerrish was general shop teacher in the Algonac Public Schools prior to joining the university faculty in 1952. He is head of the industrial-arts department in the University High School and assists in the work of industrial-arts teacher education.

## INDUSTRIAL IMPORTANCE OF GLYCERINE

**MILTON A. LESSER**

Glycerine Producers' Association

New York City, N. Y.

Glycerine ranks high among the chemical raw materials essential to modern industry. Its uses are so varied that there is hardly an industry unaffected, to some extent at least, by its employment. In fact one of our country's industrial assets is its ability to produce about 50 per cent of the world supply of this valuable fluid. The year 1947 saw a record high of over 207 million pounds for glycerine production in the United States.

Glycerine found its way into thousands of different products. Some idea of the diversity of uses is given in the following government list of glycerine consumption by products. Cellulose films (e.g., cellophane) and meat casings; dentifrices and toilet articles; drugs and pharmaceuticals; margarine, shortening, and other edibles; beverages, flavors, candy, and gum; glassine, greaseproof paper and vegetable parchment; tobacco; synthetic resins and ester gum; dynamite and nitroglycerine; gaskets and cork products; printers' rollers and supplies; adhesives, textile processing; rubber processing, cleaning materials, paper other than glassine and greaseproof; leather products; and, finally, a large miscellaneous group of consuming products.

This last group, accounting for well over 2000 tons of glycerine, embraces an equally diverse group of products, including: special chemicals, antifreeze fluids, electrolytic fluids, hydraulic fluids, coolant fluids, embalming fluids, masking and shielding compounds for spray painters, grinding compounds, soldering fluids and pastes, packings and lutes, cements, lubricants, and waxes and emulsions. Substantial amounts of glycerine also are used in the production of instruments and special equipment, as well as into materials essential in the laboratory and for research.

There are a number of very good reasons for glycerine's adaptability to so many varied uses. These become evident on examination of its physical and chemical properties. Glycerine itself is a clear, heavy, viscous fluid, with a smooth, oily feel. It is not greasy, however, but rather is fully miscible with water and alcohol, although not with most organic solvents and fixed oils. Glycerine is a remarkably good solvent in its own right, comparing in this respect with water and alcohol. This property, combined with the fact that it is nontoxic gives glycerine its unique place in the manufacture of pharmaceuticals and as an ingredient of foods and beverages.

Glycerine's high boiling point (about

(Continued on page 22A)

**NEW "DYNO-MITE" POWER WOOD BITS** with high-speed steel blades. Stay sharp 10 times longer than ordinary tool-steel bits — even cut through wire nails and screws. Start readily even at angles. 6 sizes from ⅛" to 1". Separately or in sets of 4 or 6. Set No. 8006 shown. . . . . $6.45

**BUFFING AND SANDING ATTACHMENT** for any ¼-inch electric drill. Two speeds — 1 to 2 or 2 to 1 drill speed. Sturdy and smooth-running with machine-cut steel gears and grease-sealed lubrication. Exclusive 100° angle drive. No. 2120 complete with 5" rubber pad, two 5" sanding discs and 5" lambswool bonnet . . . . . $8.45

**RIGHT-ANGLE DRIVE** to fit all ¼-inch electric drills with ⅜-24T spindles. Requires no adaptor — uses chuck of drill to which it is attached. Permits work in corners, between studs, in many spots where drill cannot be used direct. Gear ratio 1 to 1. Steel gears — grease-sealed lubrication — Oilite bearings. No. 2130. . . . . $4.95

**NEW JIG SAW ATTACHMENT** for all ¼-inch electric drills. Cuts wood, metal, plastics, etc. Capacity 2" in wood, ⅛" in metal. Makes its own starting hole in wood. Automatic air blast keeps cutting line clear of chips and sawdust. Universal joint drive assures maximum power transmission. Complete with 2 metalcutting and 2 woodcutting blades. No. 2140. . . . $10.95

**POWERFUL NO. 1814 "DYNO-MITE" DRILL** Conservatively rated at 1.7 amps. Ruggedly built for dependable, long-lasting performance year after year. Palm-fitting pistol grip and straight-line trigger switch with automatic release. An outstanding value in every way. No. 1814 with Jacobs Geared Key Chuck. . . . . $22.35

# STRETCH YOUR BUDGET

## with Millers Falls ¼" "Dyno-Mite" drills and accessories

Want to expand your power tool training program — and do it at only a fraction of the cost of specialized, individually-powered tools?

The Millers Falls "Dyno-Mite" drill and accessories shown on this page can do a lot for you in that direction. You'll find they're excellent for a wide variety of operations—and it's possible to equip the shop with a good number of each unit without straining even a modest budget.

More and more instructors are adopting this practical, economical way to provide more power tool equipment for their students — at important savings in cost. Ask your supplier to show you these fine quality, high performance Millers Falls tools today.

***FREE*** . . . New Millers Falls "Dyno-Mite" Electric Tool Catalog. Ask for it at your supplier or write direct.

MILLERS FALLS TOOLS SINCE 1868

*Finest Power Tools Made*

**MILLERS FALLS COMPANY • Dept. IA-5 • GREENFIELD, MASS.**

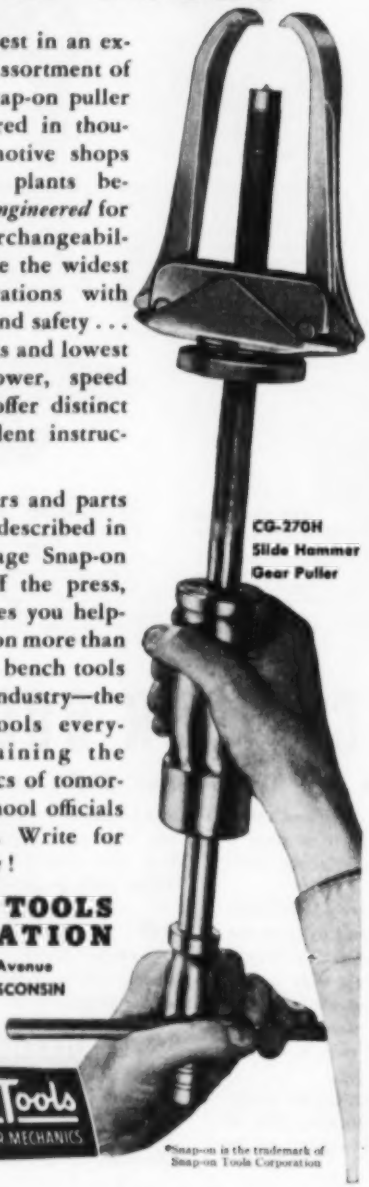
## Teach with the pullers they'll use on the job!

# Snap-on*

# INTERCHANGEABLE PULLER TOOLS

No need to invest in an extensive, costly assortment of puller tools. Snap-on puller sets are preferred in thousands of automotive shops and industrial plants because they are *engineered* for maximum interchangeability. They handle the widest range of operations with greatest speed and safety . . . with fewest units and lowest cost. Their power, speed and *versatility* offer distinct benefits in student instruction.

Snap-on pullers and parts are completely described in the new 104-page Snap-on catalog. Just off the press, this catalog gives you helpful information on more than 4,000 hand and bench tools —the choice of industry—the choice of schools everywhere for training the skilled mechanics of tomorrow. Free to school officials and instructors. Write for your copy today!



CG-270H
Slide Hammer
Gear Puller

**SNAP-ON TOOLS CORPORATION**
8074-J 28th Avenue
KENOSHA, WISCONSIN

Snap-on Tools
THE CHOICE OF BETTER MECHANICS

*Snap-on is the trademark of Snap-on Tools Corporation



## This "Oliver" is the most complete Band Saw of its size!

The "Oliver" 18-inch motor-on-shaft Band Saw has many refinements and adjustments developed for the larger "Oliver" Band Saws. Table measures 24" x 20" — heavily ribbed, accurately machined. Tilts 45° to right. Has miter cross-cut gauge and parallel ripping fence. Takes 10" under guide, 18" between saw and column. Rips to 11" wide, miters and cross-cuts to 6½". A sturdy Band Saw, precision built to give years of service. Write for Bulletin No. 192-D.

•

"Oliver" Band Saws also made in 30", 36", 38" sizes. Ask for details.

**OLIVER MACHINERY CO.,** GRAND RAPIDS 2, MICH.



## *Economical* ARBOR PRESSES FOR SCHOOL SHOPS

An ideal press for school shops requiring pressures up to 3 tons. Just the right size to handle practically al work usually found in these shops. Also widely used in all kinds of industry.

**HAND WHEEL** — Advances the ram to the work quickly and easily.

**ADJUSTABLE HANDLE** — Position is adjustable with a ratchet.

**COUNTERWEIGHT** — Keeps handle in uppermost normal position.

**AUTOMATIC BRAKE** — Automatic pressure brake holds ram in any position.

**MACHINED TABLE** — Large surface provides accurate work support.

**SQUARE RAM** — Heat-treated ram with large bearing surfaces and shimmed cap to provide long wear.

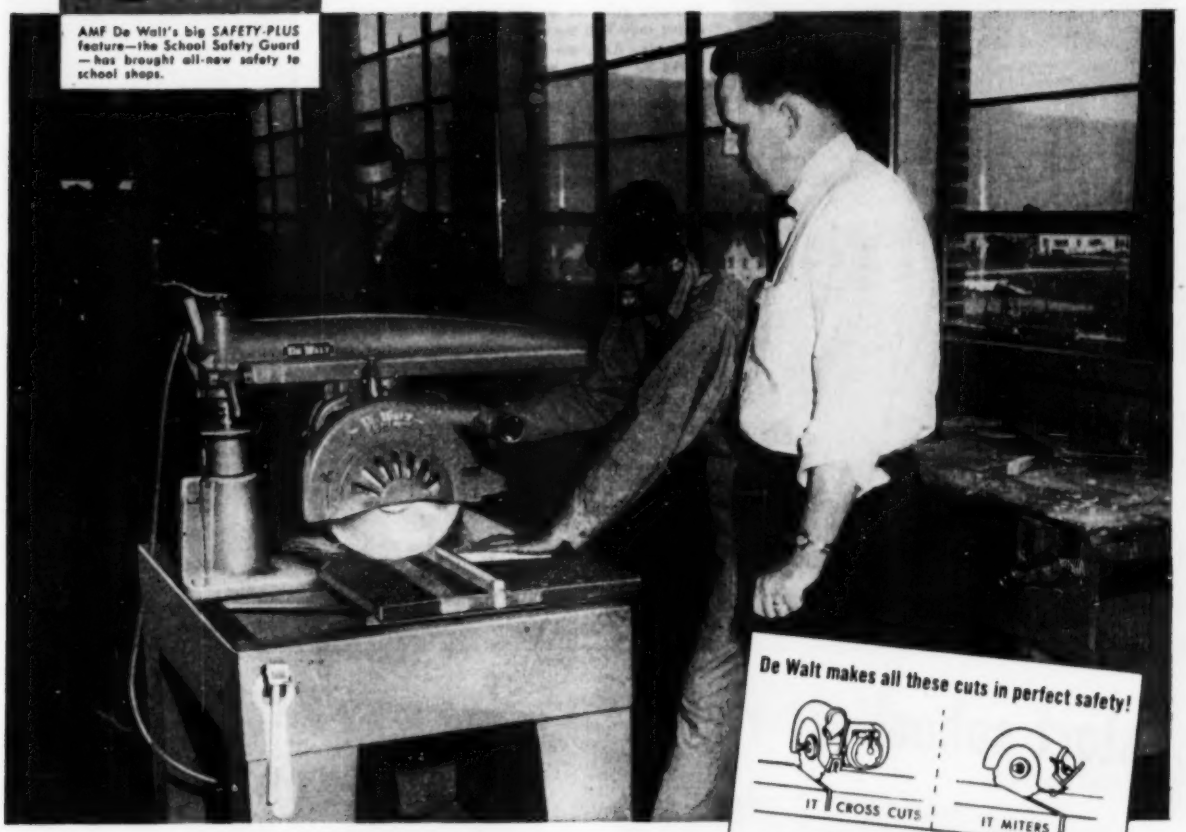
For more detailed information on this and other size presses, write for the illustrated Dake Arbor Press Catalog.

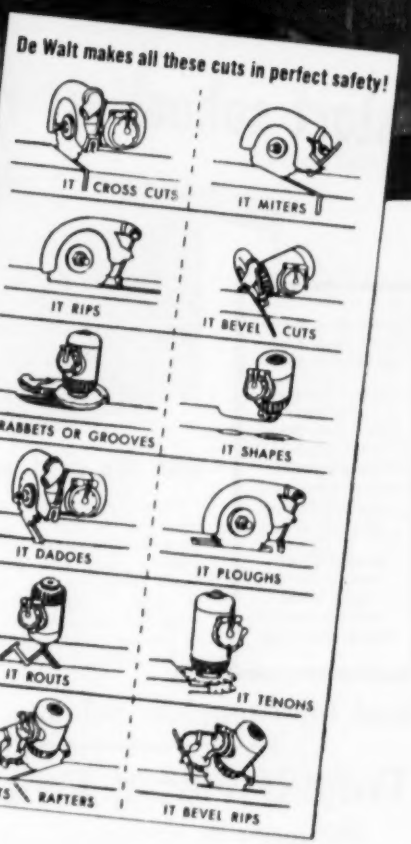
**DAKE** ENGINE COMPANY
653 SEVENTH STREET
GRAND HAVEN, MICH.

# "I'm really sold on AMF De Walt as a safe multi-purpose tool!"

says E. F. Wilson, Instructor, Vocational Agriculture Dept., George Wythe High School, Wytheville, Va.

AMF De Walt's big SAFETY-PLUS feature—the School Safety Guard—has brought all-new safety to school shops.






"Like most instructors, I was wary about having my students work with a multi-purpose tool. But when I saw how safe AMF De Walt® is, I got one right away. Now my students can learn as many as 15 different operations.

"And I don't worry about their safety, thanks to features like AMF De Walt's Blade and Arbor Guard, Anti-kickback Device for all operations from ripping position and the new Automatic Safety Carriage Lock. That's why I'm really sold on AMF De Walt."

Yes, AMF De Walt is *safe* and *versatile*. What's more it's easiest to teach and learn. Makes all cuts quickly . . . accurately.

Write us c/o Dept. IA-10-54, or your AMF De Walt dealer for illustrated catalog. Send for two 16 mm. movies on AMF De Walt—ideal for classroom instruction.

De Walt Inc. Lancaster, Pa.

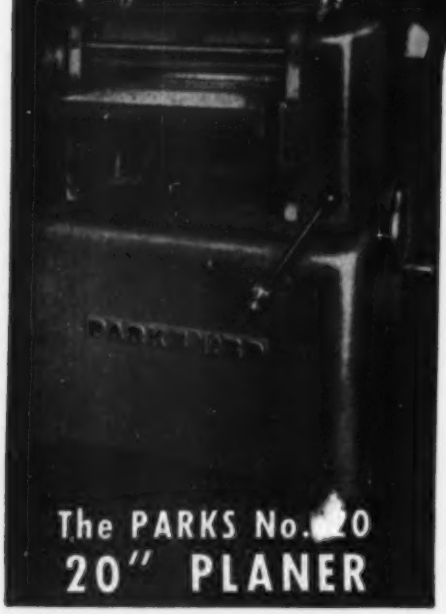
DE WALT

POWER SAWS

*Subsidiary of* **AMERICAN MACHINE & FOUNDRY COMPANY**, *New York*

IN CANADA: De Walt Canada Limited, Guelph, Ontario

# Your Students Will Learn FASTER on a PARKS PLANER



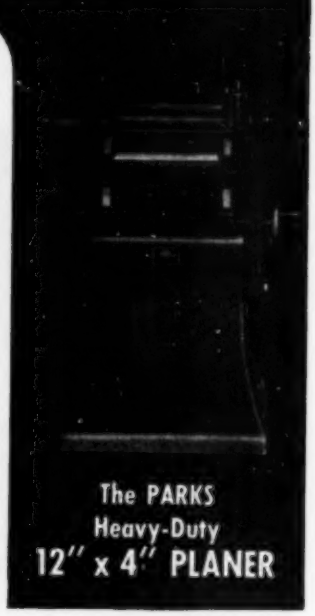

Students advance quickly on Parks Planers because they find them easy to operate, safe, and accurate. And, since both the Parks 12" and Parks 20" Planers have been designed and precision-built for accuracy and high-speed line production in industry, they are ideally suited for the school shop because they give practical experience on the type of machines your students will eventually use. Both machines are priced low enough for even the most modest shop budget.

The Parks No. 20. 20" Planer has a 4-knife cutterhead with a speed of 3600 R. P. M. and offers two feed speeds—20 and 40 F. P. M., and 40 and 80 F. P. M. Will take work up to 20" wide by 6" thick. Ruggedly built for vibrationless operation.

The Parks Heavy-Duty 12" x 4" Planer. A compact, sturdy thickness planer that offers mill planer precision at low price. Has feed speed of 16 F. P. M. at 4000 R. P. M. Will handle material as short as 6" and as thin as 1/16".

*Write for complete descriptive literature.*

Manufacturers of Quality Woodworking Machines since 1887.




**The PARKS WOODWORKING MACHINE CO., Dept. 24-C10, 1546 Knowlton St., Cincinnati 23, Ohio**

# start school off right

No. 64-50-400B

Woodworking Benches
Metalworking Benches
Automotive Shop Benches
Agricultural Shop Benches
Paint & Stain Benches
Glue Benches
Soldering Benches
Welding Benches
Moulding Benches
Electrical Shop Benches
Ceramics Benches
Drawing Tables
Layout Tables
Stools — Chairs
Storage Equipment

## with the right equipment

This four student woodworking bench has a smooth 2¼"laminated naple top, equipped with four woodworkers' vises, four dogs, and four bench stops. Overall bench size is 64" long, 50" deep, 33¾" high.

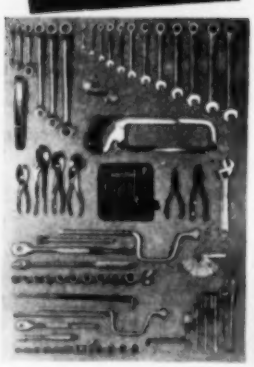
All-steel storage base consists of 12 roomy box lockers (back-to-back), each 12" wide, 21" deep, 15" high.

Send for Complete School Catalog!

PARENT METAL PRODUCTS

400 Locust St., Philadelphia 6, Pa.

PUZZLE: Which Man Owns the NEW PROTO Mechanics Standard Tool Set?



No. 9908 Tool Set. No. 9909 is same, plus tool box.

This new 76-item set, consisting of the most-needed tools, is designed to help you do your work easier and increase your earnings. *Professional quality*, advanced designs and special alloy steels make this set a real value. Work faster and make more per day with the No. 9908 set. Buy one from your PROTO dealer. Send 10¢ for 68-page catalog to

PLOMB TOOL COMPANY
2204V Santa Fe Avenue
Los Angeles 54, California

5491

PROTO TOOLS

Eastern Factory—Jamestown, N.Y.
Canadian Factory—London, Ont.

# *Industrial Type Projects*

## Are easily handled in school shops on this 11" swing Logan Lathe*

*One of the many in the complete Logan Line of 9", 10", 11" and 12" swing Lathes, and 8" Shapers.

**No. 1925**—Quick Change Gear Lathe on 3-Drawer Cabinet Base . . . 1" Collet . . . 1⅜" Spindle Hole . . . 24" between centers. **$875.00** F.O.B. Chicago.

Student interest in shop work is sharply stimulated by the wide range of challenging projects this 11" lathe permits. With its 1" collet capacity, 1⅜" spindle hole and 24" centers, the "1925" turns work of substantial size. Furthermore, it enables your students to learn on one of American industry's standard modern lathes.

Advanced design and rugged, accurate, safe construction make the 1925 an ideal training lathe. The spindle revolves on preloaded *ball* bearings of extreme precision that need no adjustment for any speed in the full range of 45 to 1500 rpm. The rugged, balanced special alloy bed has two V-ways and two flat ways precision ground. The automatic apron, double-walled and friction-free, with spline-driven power cross feed, has a convenient, lever-operated disc type clutch. V-belt drive, headstock, countershaft and motor are enclosed. Controls and switches are easily accessible. The low price, resulting from efficient production in the modern Logan plant, places the 1925 within range of the modest school budget.

### Brief Facts

Collet Capacity, 1"
Spindle Hole, 1⅜"
Swing over bed, 11⅛"
Center Distance, 24"
Bed Width, 6 15/16"
Ball Bearing Spindle
16 Spindle Speeds, 45 to 1500 rpm
Double V-belt Drive for extra power to spindle is completely enclosed
Threads—48 selections, RH or LH—4 to 224 per inch

***Write for the Logan Lathe Catalog***

**Logan ENGINEERING CO.**
Lawrence and Lamon Avenues, Chicago 30, Illinois

LOOK TO Logan FOR BETTER LATHES AND SHAPERS

# EVERY SCHOOL SHOP NEEDS THIS EQUIPMENT

## FOR ADDING METAL SPINNING

If you have a good lathe in your shop, a few Boice-Crane spinning tools and accessories permit the instruction of metal spinning. If you have no lathe, Boice-Crane can supply a gap-bed lathe as well as the spinning tools. In any event, you should send for Boice-Crane's FREE instruction book on Metal Spinning.

## FOR SAFER, EASIER, CLEANER SHAPING

### TRU-FORM CUTTERS
*(with involute relief)*

Safer! Always cut true, original shape and dimensions. Improved clearance for high speed shaping throughout the 50% longer life of the cutter. Less cutting edge crumbling than straight relief cutters. Precision formed from uniformly deep-hardened fine tungsten tool steel. Razor sharp. Authentic pattern individual cutters and sets for all cabinet work, mill-work, windows, storm sash and doors.

## FOR BETTER HAND TOOL MAINTENANCE

End tool sharpening troubles with the

*Friction-Matic*

### DUAL WET GRINDSTONE

Any student can operate without the slightest danger of drawing the temper of costly shop edge tools, as so frequently happens with high speed dry grinders. Consists of two complete grinder units, one coarse standard Ohio sandstone wheel, and one high quality extra fine grain Arkansas-type wheel, driven by a single double shaft motor. Constant speed. Positive, spring-loaded friction drive automatically speeds up the stone as stone wear occurs through use. The only grinder which by maintaining near-constant peripheral speed, guarantees the last grind on the stone to be as efficient as the first. Grinds wet, but operator stays dry. Don't compare "Friction-Matic" with wet grindstones that throw water. Rubber friction roll drive automatically squeegees excess water from the wheel. Comes complete with two grinding units, bench base, V-belts, V-pulleys and double end shaft ½ H.P. motor for 110-V, 60 cy., 1 phase, A.C. Shipping weight 90 lbs. Six other single unit models.

***Free!***

## BIG NEW CATALOG ON BOICE-CRANE POWER TOOLS FOR CUTTING ★ SHAPING ★ DRILLING ★ FINISHING

FLEXIBLE—Readily adaptable to a wide range of projects.

SAFETY ENGINEERED—As nearly 100% safe as modern devices permit.

BUILT TO OUTLAST—Boice-Crane tools can take a beating which would incapacitate most machines.

INTERMEDIATE CAPACITY—Boice-Crane power tools are just the right size for most of your projects. They're not too big, nor too small.

MODERATELY PRICED.

## BOICE-CRANE COMPANY

932 Central Avenue • Toledo 6, Ohio

Please send free literature on ☐ Metal Spinning; ☐ Tru-Form Cutters; ☐ Dual Wet Grindstone; ☐ Complete line of Boice-Crane Power Tools.

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***DELIVERY:*** **NOW**

V2-D . . . DOUBLE WORK BENCH. 52" long x 36" wide x 32" high. Two working sides, each equipped with vise, adjustable bench stop, movable bench dog, and tool drawer.

**SJÖSTRÖM** ***WORK BENCHES***

## JOHN E. SJÖSTRÖM COMPANY, INC.

1712 NORTH TENTH STREET, PHILADELPHIA 22, PA.



MAYLINE

C-7702 DRAFTING TABLE

for the Very Best in Classroom Furniture Specify

## MAYLINE

All school furniture sold direct. High grade products with attractive prices. Catalog S-1 sent on request.

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C-7703B DRAFTING TABLE

Symbol of MAYLINE Superiority

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# STANLEY SHOP TALK

## NEW BIT GAUGE

**The Stanley #47** — A fully adjustable bit gauge that will not mar any surface. When the hole is bored to the depth wanted the gauge end touches the work. If boring continues this flexible spring bends — but it won't mar the surface.

## BIT BRACE & AUGER BIT

**The Stanley "100 PLUS" #100** — The Russell Jennings auger bit shown here is ideal for use with the 923 Brace. Shop-tested and proved, this double threaded screw point bit bores easily and cuts a smooth, accurate hole.

**The Stanley "100 PLUS" #923** — This brace features the new, built-in Self-Centering Chuck that makes bit centering automatic and positive. It holds any size auger bit and straight shank drills from ⅜" to ½".

## HAND DRILL

**The Stanley "100 PLUS" #610-¼"**
A compact drill for wood and metal. It has enclosed gears so there's no place to catch hands and clothing and the chuck is locked to the spindle by a snap ring which prevents threading off. Here's a *really* boy-proof drill. Also #611-⅜" chuck.

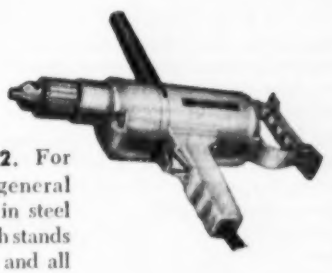
## "YANKEE" PUSH DRILL

**The Yankee "100 PLUS" #41.** The mechanic's friend, this sturdy all metal tool is ideal for shop use. Bores smoothly with a one-hand drilling action. The drill point in use is locked in. Drills from 1/16" to 11/64" (by 64ths) are stored in the magazine handle.

## ELECTRIC DRILL

**The Stanley #235.** A fistful of power, the "Mighty Midget" is light enough for the smallest boy in the class — 8¾" long and only 3¾ lbs. This is the most powerful drill of its size . . . drills ¼" in steel and ½" in hard wood. Full ball-bearing. Available in six different speeds.

## ELECTRIC DRILL



**The Stanley #112.** For heavier work; this general purpose drill cuts ½" in steel and 1¾" in wood. Bench stands are available for this, and all Stanley Electric Drills.

**Use this coupon for more detailed information and school shop help**

**STANLEY TOOLS, Educational Dept. B, New Britain, Conn.**

FREE ( ) Please send me the Stanley Educational Dept. News
FREE ( ) Please send me Stanley Tool Catalog No. 34
FREE ( ) Please send me the Stanley Electric Tool Catalog
FREE ( ) Please send me "Yankee" Screw Driver Chart No. Y43

25¢ each
15¢ in lots of 10 or more
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Name.....
Subject You Teach or Position.....
Address.....
City.....Zone.....State.....

**STANLEY** TOOLS

STANLEY®

HARDWARE
ELECTRIC TOOLS
STEEL STRAPPING
STEEL

**IDEAL SHOP UNIT**
*keeps bits readily at hand*

### 13 "GREENLEE 22" SOLID-CENTER AUGER BITS IN METAL HOLDING PANEL

Here's the handy, complete auger bit set designed especially for shops. Provides a practical assortment of bits and keeps them in order for you.

Panel has a holder for each bit with size clearly marked. Makes it easy for students and other workers to select the bits they need . . . *then return them to their places* so the next user knows where to find them!

Set includes 13 famous "GREENLEE 22" Solid-Center Auger Bits in sizes 4/16" to 16/16". These bits bore smoothly, accurately and have solid-center design which gives extra strength and provides positive, fast chip clearance. All are "Induction Heat-Treated" for uniformity, long life.

Solidly built metal holding panel has a sturdy metal easel and two knockout holes at top so that it may either be used standing up on a workbench or hung on the shop wall. Equip your shop with this handy, high-quality GREENLEE unit. At leading hardware and building supply dealers.

Write for free Catalog 35-H with information on the complete line of high-quality hand tools.

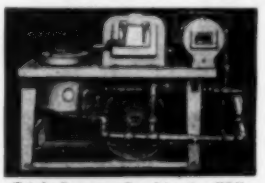
TOOLS FOR CRAFTSMEN
GREENLEE

GREENLEE TOOL CO., 2030 Twelfth St., ROCKFORD, ILLINOIS

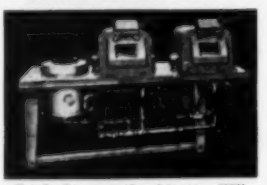
# Sunbeam STEWART

THE BEST INDUSTRIAL FURNACES MADE

### THOUSANDS OF THESE SUNBEAM STEWART FURNACES ARE IN THE VOCATIONAL DEPARTMENTS OF TECHNICAL SCHOOLS



*Triple Purpose Combination "D"*



*Triple Purpose Combination "E"*

Because Sunbeam Stewart units have been designed for efficient production heat treating in small shops and tool rooms, they are widely recognized as standard equipment for all types of industrial heat treating and vocational training work. To provide complete heat treating facilities for training purposes Sunbeam Stewart especially designed combination units, shown at left.

For student instruction and reference, write for free "Guide to Furnace Selection." Aids in determining the type of furnace best suited for any work. Also ask for Data File on school units.

**SUNBEAM CORPORATION** (Industrial Furnace Division)
Main Office: 4433 Ogden Ave., Dept. 114, Chicago 23, Ill.

# ARMSTRONG

Teach with the tools actually used in industry

with ARMSTRONG TOOL HOLDERS — used in over 96% of the Machine Shops and Tool Rooms. A complete system of Tool Holders comprising over 250 sizes and shapes. Develop "tool sense" and a love for fine tools with ARMSTRONG Drop Forged WRENCHES — Hi-Ten and Armaloy Steel Open End Wrenches; Box Socket and Detachable Socket Wrenches with improved designs, better balance, finer machining and finish. Set up jobs with modern, safe ARMSTRONG Drop Forged Setting-Up Tools. Use ARMSTRONG Drop Forged Clamps that never slip, spring or spread, and ARMSTRONG Drop Forge Lathe Dogs that are standard everywhere.

*Write for Catalog and Cutter Grinding Charts, sent upon request to Instructors.*

**ARMSTRONG BROS. TOOL CO.**
*"The Tool Holder People"*
5222 W. ARMSTRONG AVE. CHICAGO 30, U.S.A.

## A NEW, LOW-COST JIG SAW

## Perfect for School Shop Projects!

**DREMEL MOTO-JIG SAW OUT-PERFORMS OTHERS COSTING MUCH MORE!**

Only $23.59

Complete with ROTARY MOTOR

***POWERFUL...***

Built-in ROTARY MOTOR (not a vibrator) cuts 1½" wood, ¾" plywood, metals, plastics, etc.

***GREATER VERSATILITY...***

4-Way-Blade Holder saws in any direction — handles any length stock. Table tilts 45°, also raises and lowers.

***SAFE...***

Foolproof blade guard makes it safe to operate, ideal for student instruction.

***SIMPLE TO OPERATE...***

Just plug it in... flip toggle switch. Blades easily changed in a jiffy. Has no blade tension spring to adjust.

***ECONOMICAL...***

Inexpensive to buy, to operate and maintain. Priced for tight school budgets.

***ROCKER ACTION...***

This exclusive Dremel principle obsoletes the old style blade tension spring. Cuts faster — eliminates blade breakage.

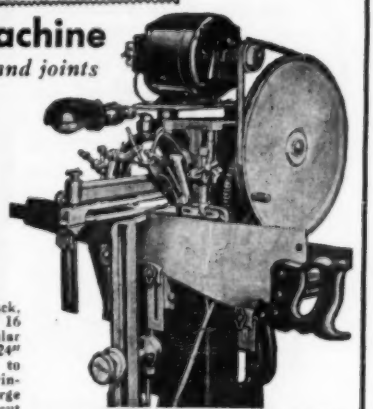
Get the complete story! Write for free catalog!

**DREMEL MFG CO.** Dept. 314-K Racine, Wisconsin

## SAW FILING

### This ONE Machine

*automatically files and joints*



### HAND, BAND, CIRCULAR SAWS

The Foley Saw Filer is ideal for sharpening saws used by students in school shops. It keeps them in tip-top shape, faster and better than by hand filing. Used by Army, Navy, hundreds of manual training departments and industrial plants. The Foley is the only machine that files and joints all hand, back, and mitre box saws from 3 to 16 points per inch, crosscut circular saws up to 16" diameter (24" optional), and band saws up to 24' long. Patented jointing principle automatically evens up large and small teeth, so saws cut faster, truer, cleaner — stay sharp longer. Foley filed saws have less breakage and last longer.

**30-DAY TRIAL OFFER**

You may have the privilege of using the Foley Saw Filer in your own shop for 30 days. Write or send coupon for details and list of school users.

**TYPICAL SCHOOL USERS**

Berea College, Berea, Ky.; Board of Education, Cleveland, Ohio; Boys Technical H. S., Milwaukee, Wis.; Charleroi School District, Charleroi, Pa.; Redlands Public Schools, Redlands, Calif.; Stout Institute, Menomonie, Wis.

**FOLEY Automatic SAW FILER**

FOLEY MFG. CO., 3318 N.E. 5th St., Minneapolis 18, Minn.
Please send information and Trial Offer on Foley Saw Filers.

Name.....

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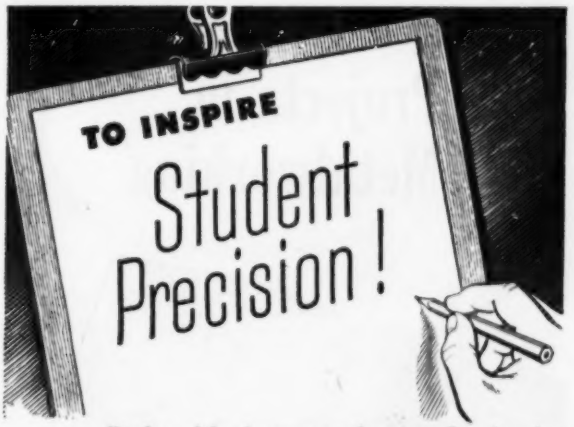
School.....

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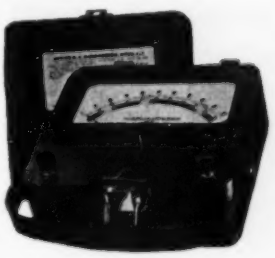

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*Written by*
**DONALD G. LUX**
*Instructor, Division of Industrial Education*
**State University*

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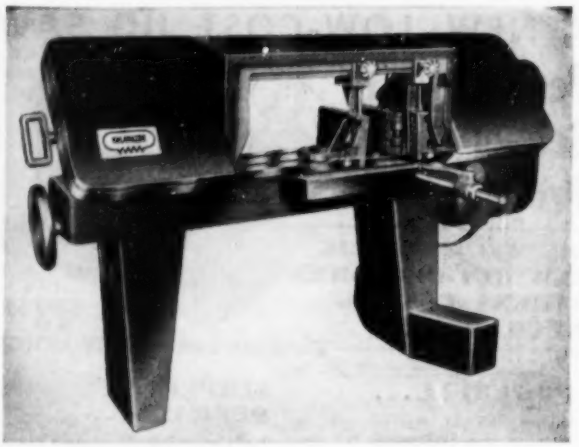

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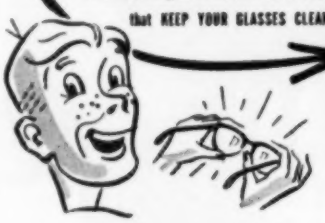

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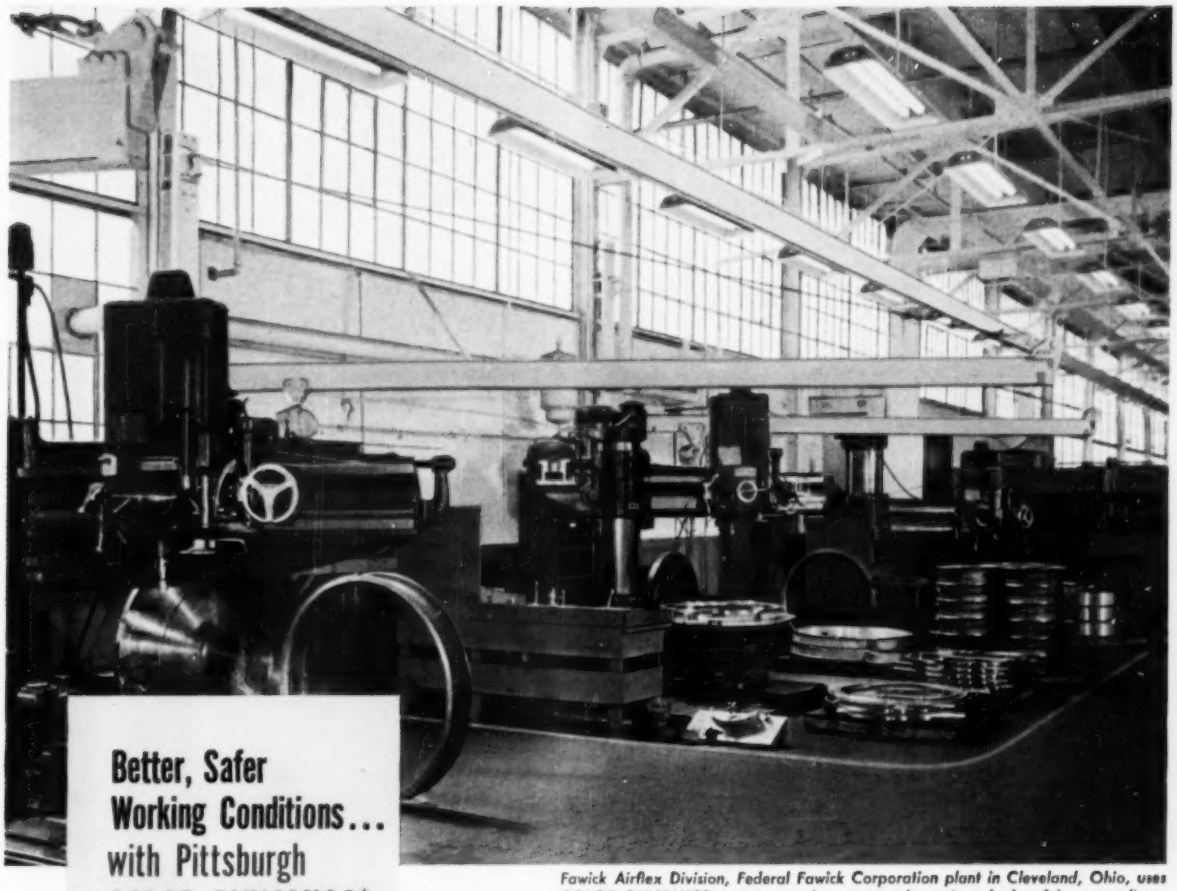

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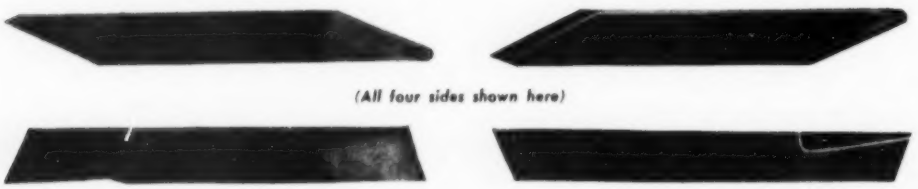
# HOW-TO project for the School Shop

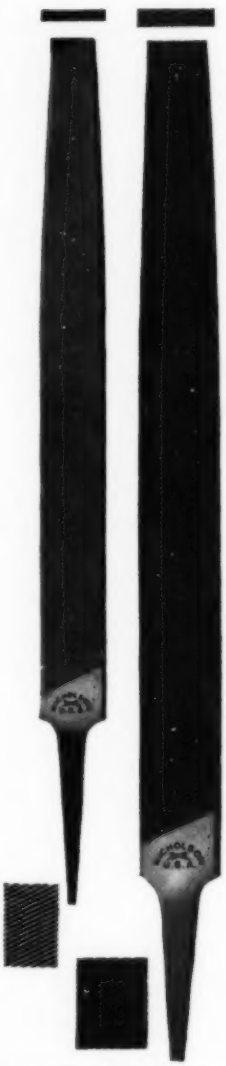
—by NICHOLSON FILE COMPANY

NO. 2 OF A SERIES

## SHAPING A TOOL BIT



*(All four sides shown here)*

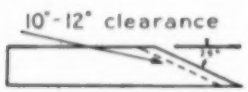


Whether the student is aiming directly toward the trade of toolmaker or toward the broader fields of the expert mechanic, projects like the one described below offer excellent school-shop practice in exact filing. Here particularly is an example of the precision attainable with the two oldest and most commonly used file types, provided each is of the right size, cut and QUALITY for the job.

**Material:** One piece of 5/16" Key Stock 2 1/2" long.
**Tools:** 10" Flat Bastard file for wide surfaces; 8" Mill Bastard file for narrow surfaces and for finishing; 6" protractor; 6" rule.

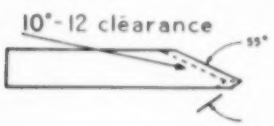
**STEP SCHEDULE OF OPERATIONS** for shaping a Right Side tool and a Right-hand Round Nose tool. (A right-hand tool cuts from right to left; a left-hand tool from left to right.) The object of this problem is to fix clearance and rake angles in the student's mind, so that he will know how to grind his High Speed tool bit with a minimum of time and waste of stock.

1. Place stock in vise at approximate angle of 25° and file a 10° or 12° clearance angle on side No. 1.



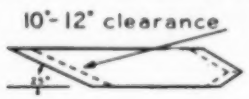

1

2. File side No. 2, making an included angle of 55° allowing a clearance angle of 10° to 12°. This is the approximate shape of a Right Side tool for squaring or finishing the ends of work.



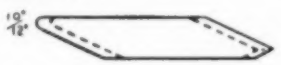

2

3. File side No. 3 the same as side No. 1.



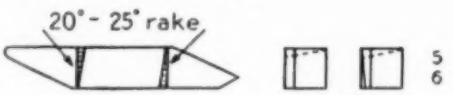

3

4. File radius of 1/16" on end of No. 4 having a clearance of 10° or 12°. This is the approximate shape of a Round Nose tool used for turning diameters.



4

5. Place stock so that filed part of No. 3 will overhang side of vise and file rake of 20° to 25°. (This rake is not used on brass as it will cause tool to hog into the work.)




5 6

6. File rake on No. 6 the same as on No. 5.

These reproductions are approximately half the lengths of the files designated for this project. The cut (Bastard) of each shown in the swatches is in the actual degree of coarseness. QUALITY—the invisible "third dimension"—is assured by the trademark of the world's finest in files—**NICHOLSON.**

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for school-shop use will be sent to school heads or instructors on individual request. Ask for "How-to Project No. 2" and give minimum number of copies you need. The files recommended in the foregoing text (made in both Nicholson and Black Diamond brands) are widely obtainable from industrial supply houses and hardware dealers.

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*Industrial Arts and Vocational Education*
The Shop Teachers Professional Magazine
OCTOBER 1954

A Troublesome Question

# Criterion for Selecting Industrial Arts Content Areas

**GLADE WILCOX**
Indiana University
Bloomington, Ind.

*A Statement of the Place and Function of Industrial Arts in Education,* as prepared by a subcommittee of the American Vocational Association's Industrial Arts Policy and Planning Committee has stated that:

Industrial arts is instructional shopwork which provides for all youth sound educational experiences that contribute to the satisfaction of their purposes, needs, and wants.

It is an integral part of the general education program of all youth. It offers those learning experiences which assist boys and girls to understand the industrial and technical aspects of life today. It is a curriculum area that makes a realistic contribution to life adjustment education. It shares with other areas of the school, the responsibility for promoting the optimum development of the good citizen.

The unique contributions of industrial arts are centered mainly around significant aspects of the manufacturing and construction industries and their effects on daily living. Those who participate in industrial-arts programs receive orientation in the areas of production, consumption, and recreation through actual experiences in planning, producing, servicing, and repairing various types of consumer goods in common usage. Through these experiences young people learn about material goods. They learn how such goods are made. They learn how to use and maintain them intelligently. They develop general skill and resourcefulness in working with things, technical and mechanical. They learn facts, principles, and procedures about tools, materials, processes, mechanics, and design. . . . They learn to do critical thinking in solving problems related to these matters. . . .

The subcommittee gives the purpose as follows:

The purpose of industrial arts is to foster the development of a strong foundation in the skills, knowledge, and attitudes regarding technical matters that are needed for happy and effective living in America. Public secondary education must give every youngster the chance to learn to work with tools and materials and to acquire reasonable judgment and some degree of technical know-how. Industrial arts serves that purpose.

As an integral part of the general education program the selection of content areas in industrial arts should be derived in the same manner as content is selected in general education. The selection of subject matter takes four facets: judgmental, experimental, analytical, and consensual procedures.[1] In the judgmental procedure it is necessary to know what social and educational objectives are accepted and what is the state of affairs that makes these objectives desirable and appropriate. From these two premises by syllogistic logic is derived the subject matter that best satisfies these objectives. By definition in the committee's report on the place and purpose of industial arts we find industrial arts should offer learning experiences which assist boys and girls to understand the industrial and technical aspects of life today. Ours is an industrial society composed of many areas within industry as a whole. These areas in turn are desirable and appropriate if they fulfill the needs, wants, and purposes of all the youth. The organization of these areas based on social and educational objectives necessitates the unbiased democratic survey of total areas which are predominate in our industrial culture; not the grouping together by biased undemocratic methods which result in the elimination of major sections of any one of these areas as has often been done.

The experimental procedure of content selection is a means used to ascertain by actual experience whether or not the subject matter is significant to a field of organized knowledge. Is it interesting? Is it material used by adults? Using this analysis: What courses in industrial arts are now being taught, have ever been taught; and have existed because of their significance over a period of time? To what extent do these courses meet our criterion of significance?

A review of courses taught in order of total classes should read about as follows: woodwork, drawing, metal, electricity and radio, auto mechanics, and printing; with textiles, ceramics, leatherwork, plastics, and lapidary work found to a much lesser degree. Note should be taken of the semantics of the terms as given. Woodwork is also woodworking, woodshop, general woodworking, and many other inferences. Actually it is a grouping of content by material as used in the manufacturing and construction industries. Using the experimental procedure to determine significance, and knowing the nature of our society and the objectives of indus-

[1]Smith, Stanley, and Shores, *Fundamentals of Curriculum Development* (New York, N. Y.: World Book Co., 1950).

trial arts, one could ask: Is general crafts significant to a field of organized knowledge about American industry? Is there a significant crafts industry?

The third procedure for content selection as found in general education is the analytical procedure. It consists of an analysis of things people do in order to discover the subject matter as found in the activity as it exists. Two means suggest themselves. First, if the objectives are prevocational training, guidance, avocational information, consumers information, etc.; one can determine the number of workers, the number of job openings, the number of hobbyists, the number of dollars sale, etc., in each area; balancing them out (there is a circulation of over two million radio amateur handbooks. However, radio, a popular avocation, is based on general electrical principles and thus is usually included with electricity in industrial arts) and including the areas that meet these objectives.

The second means, based on things which people do, is an analytical procedure that can use the recent census which gives the following listings:

| *Area* | *Avr. No. Employed* |
|---|---|
| Agriculture | 10,351,000 |
| Manufacture | 14,294,304 |
| Food and kindred products | 1,441,847 |
| Textile mill, apparel and related products | 1,345,213 |
| Lumber, furniture fixtures, and lumber products | 958,092 |
| Paper, allied products, printing and related products | 1,165,283 |
| Chemicals, petroleum, and products | 844,322 |
| Leather, and leather products | 383,175 |
| Stone, clay, and glass products | 462,072 |
| Primary and fabricated metal products | 2,128,585 |
| Electrical appliances, machinery and related products | 1,033,356 |
| Transportation equipment | 1,181,680 |

From this information, if the food processing industries were to be studied in home economics and agriculture is left to the agriculture classes, a burden of areas employing over 12 million employees (tobacco industries, etc., omitted) rests on those that make up the selection of content for industrial arts. If selection is made by number of employees and the number of areas limited to only those employing more than 1 million people the five following industries would be studied:

| *Area* | *Employees* |
|---|---|
| General metal industries | 2,128,000 |
| General graphic industries | 1,165,000 |
| General textile industries | 1,345,000 |
| General transportation industries | 1,180,000 |
| General electrical industries | 1,033,000 |

Thus we see that such areas as general wood industries (958,000), general chemical industries (844,000), and general ceramics industries (462,000) would be omitted. Based on this procedure it becomes a semantic fallacy to call a content grouping general power-mechanics when included in the same listing as general wood, general metals, and general graphics.

The fourth and last facet is the consensual procedure. It is based on determining what the curriculum should be, as founded on people's opinions. A common application of the consensual procedure is found in a committee made up of experts in the field of study from which the subject matter is to be selected. This is a method that has been popular in industrial arts and vocational education. This was presumably the method used in the recent report by the A.V.A. on the statement of the place and function of industrial arts in the education.

The consensual method can only be effective when the group that applies it is a true representation of those whom the group is to represent. This has not always been true, for the adherence of a majority of the sample to any dogma not in majority over the universe invalidates the committee's report.

At the same time the analytical procedure yields static results — content which supports the *status quo*. In the example given of the application by analysis of the number of workers in industry as used to determine content, the second weakness of this method is evidenced: namely the breaking down of the elements into an organization which is atomistic and thus is nonsensical.

When the experimental procedure is used in its true sense (to set up control groups, determine results objectively, and check the results against the hypothesis to determine proof) it is open to question in that all the factors cannot be controlled. The use of larger numbers of control groups as suggested by Cronback[2] assists in alleviating this weakness. The examination of what is now being taught as a substitute for control groups, and the objective evaluation of this content (analysis of courses of study, reviews of periodical literature, critical studies of texts, and tabulations of content titles from supervisory reports are all used) have shown that courses as outlined in "Improving Instruction in industrial arts"[3] are predominant.

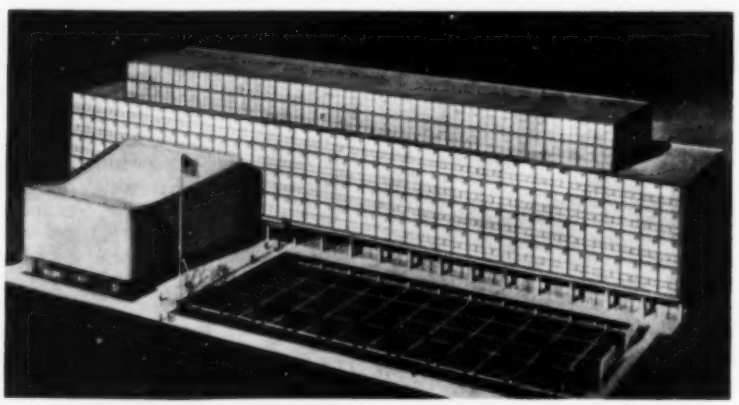
The selection of content by the judgmental procedure is influenced by the social prejudices and perspectives of the person or persons making the selection. However, with informed, critical, judicious persons making the selections, the judicial method becomes the most dependable method available.

As the content is to develop a strong foundation of skills, knowledge, and attitudes regarding technical matters that are needed for happy and effective living in our industrial society, it must develop the ability to achieve. For it is through continuous achievement that high standards of skillful work can be maintained. A partial or unbalanced grouping of content into areas not found as such in our industrial society cannot supply the content to maintain the high standards of achievement in skills and thus the related knowledge becomes less meaningful.

These areas can become the mortar for a strong industrial-arts course; when the selection and grouping of content utilizing established methods as found in education today, and when the basic areas are a true sampling of industrial materials, processes, organization, occupations, and problems. Then, and only then, will we within ourselves be strong and thus will industrial arts assume its true position in a strong American education.

[2]Cronback, "Educational Psychology," *Annual Review of Psychology*, 1950.

[3]A.V.A. Industrial Arts Division, 1946.



Plans for a seven-story, $5,100,000 building to house the New York School of Printing have been approved by the New York City board of education.

Five floors are to be used as shops and the two top floors are to be classrooms.

# Industrial Arts Supervision at the Senior High School Level

**STEVE GALE**
Instructor Trainer
Department of Instructor Training
Chanute Air Force Base, Ill.

In the past, and to some extent today, supervision was interpreted according to its liberal meaning. The supervisor was a person in a position of superior authority whose task was to inspect, to criticize, find fault and correct the activity of the person in a position of inferior authority. That concept of supervision, at least in education, is being slowly discarded. Instead, supervision is coming to be regarded as a special type of leadership. It doesn't necessarily nullify the line-staff relationship between the supervisor and teacher.[1] It merely alters the nature of this relationship, substituting for authority the implementation of better teaching, leadership, understanding, greater resourcefulness, superior training, a genuine interest to improve, and a spirit of co-operativeness.

### Principles of a Supervisory Program

Perhaps, at this point a statement of the principles of a sound supervisory program is in order. The following set of principles, gathered from current literature, may well apply to any type of school.[2]

1. Supervision should elicit the cooperative effort and varying abilities of the entire school staff — and at times even the effort of the student body.

2. Supervision should recognize the limitations of its staff. Experts and specialists should be employed when their services would be of value and placed in a supervisory position functioning as a resource person.

3. Whenever possible, initiative in planning activities should come from the individual who shall be mainly concerned with carrying them out. The supervisor should be in a position to suggest and offer guidance.

4. A spirit of personal growth should pervade the atmosphere of everyone's situation.

5. The primary purpose of supervision should be the improvement of the pupil by making possible the betterment of the teaching-learning situation.

6. Supervision should, at all times, attempt to utilize the special abilities of the teacher.

7. Outcomes and objectives should be definitely stated and the teacher held responsible for those that fall in his sphere.

8. Supervision should never be static. It must continually study its techniques and be flexible enough to meet the differing needs of the school, teachers, and pupils.

9. Division of responsibility and work should strive for economy of effort and elimination of overlapping functions.

10. Due recognition should be given to those making outstanding contributions.

Having a philosophy of education and a set of principles of supervision, the next step is the formulation of a program of supervision. Although the responsibility for planning the program of supervision rests in the hands of the principal, current educational philosophy states that it should be a co-operative enterprise, utilizing assistant principals, co-ordinators, and representative teachers.

### The Philosophy of Supervision

1. Formulate a philosophy of supervision. This naturally would grow out of the philosophy of education to which the school dedicates itself. However, the resultant philosophy of supervision, should be the product of group thinking involving full staff meetings held for that purpose.

2. Analyze the weaknesses of the existing supervisory procedures. Criticism cannot often be divorced from personality factors, yet, if progress is to be made, such analysis and criticism should be a continuous phase of any program of supervision.

3. Analyze existing weaknesses in the educational program (both in material offerings and techniques in teaching), which the program of supervision should attempt to correct. The supervisory program must be based on a set of objectives developed out of existing pupil-teacher needs.

4. Determine which persons within the school, and which persons and agencies outside the school, may be utilized in helping to carry forward the program of supervision.

### Techniques of Supervision

If we accept the now current concept of supervision, namely: that its main function is to improve the teaching-learning situation and thereby help realize the principal objectives of secondary education, the four points just listed assume significance. Supervision becomes no longer a practice in education important for its own sake, but important only to the degree to which it serves the main function of education.[3] The techniques of supervision should then come in for scrutiny and analysis. Visitation or inspection, although still a function of supervision, must lose their previous connotation, that of mere faultfinding, and assume a more wholesome purpose, that of working out with the teacher ways and means of correcting any existing faults. In addition such other techniques or procedures in supervision must be added as:

1. Periodic evaluation of the results of instruction through the use of the survey method and of appropriate tests.

[1]H. Boodish, INDUSTRIAL ARTS AND VOCATIONAL EDUCATION magazine, Oct., 1946, Vol. 35, No. 8, "Supervision in Industrial Arts," p. 344.
[2]Erickson, E. E., *Teaching the Industrial Arts* (Peoria, Ill.: Manual Arts Press, 1946), pp. 356-357.
[3]Smith, Homer J., *Improving Instruction in Industrial Arts*, Bulletin on Standards of Attainment in Industrial-Arts Teaching, p. 12, Industrial Arts Division, Washington, D. C., 1946.

2. Periodic evaluation of curricular offerings in terms of changing social and pupil needs.

3. Continuous evaluation of teaching techniques and research in new teaching aids such as the use of films, radio, field trips, opaque projectors, overhead type projectors for transparent projection, and newer types of tape recorders.

5. Provision of opportunity for individual conferences between the supervisor and the teacher as well as provision for group meetings of a departmental nature and whole faculty meetings.

6. The maintenance of a constantly replenished professional library.

7. The provision of opportunity for teachers to initiate and to experiment with new curricular offerings and new teaching techniques.

8. The provision of opportunity for all staff members to make use of other persons and agencies connected with the education of the pupil as consultants, advisers, psychiatrists, specialists in remedial reading, social case workers.

9. The issue of a handbook and periodic bulletins to acquaint both the faculty and the students of school rules and regulations, and of other pertinent information regarding the schools' operation.[4]

### Fields Requiring Supervision

The areas in industrial arts with which supervision concerns itself must naturally grow out of existing needs. These are (1) instruction, (2) program of studies, (3) testing.

*Instruction:* It is no longer true that he who cannot do anything else becomes a teacher. Teaching has become a profession. Good teaching is an art. It, like any other art, demands a sincere love for the work, an interest in children, a number of years of training in general and professional education, and special training in general in the teacher's field of teaching. The tendency is toward more and better preparation. However, the recent war emergency created a vast shortage of teachers. To meet this emergency, it appears that many school districts have hired practically anyone with college training as a teacher without questioning their teaching ability. The lowering of professional standards — whatever the reasons — is detrimental not only to teaching as a profession, but to the causes of education itself.

But more preparation and certification is not the only requisite to proficiency on the job. Good teaching requires continuous self-evaluation and constant study of teaching techniques in line with changing curricular offerings and pupil needs. It is in this phase of instruction that supervision can be of greatest service. The teacher must first arouse his own desire to grow and develop on the job. Then he must seek constructive stimulation from the program of supervision, in leadership and guidance. Obviously, there will be many factors that will affect good teaching. But with those that are directly or indirectly related to instruction, such as teacher load, disciplinary problems, size of classes, curricular offerings, and program of activities, supervision is directly concerned. To solve these problems, supervision must call on the co-operative efforts of all staff members, promote constant research and experimentation, and develop new techniques of co-operative supervision.[5]

### Program of Studies

Human beings seem, by nature, to resist change. It is easier to do things as they have been done in the past than to suddenly make an about-face and do something that is new and different. Yet, progress demands that we sometimes must cast away our old habits, and our old beliefs and traditions. If they no longer serve our best interests, we must adopt new beliefs and new ways of doing things. Not infrequently this has been accomplished without a struggle, whether it be in the field of government, industry, or education. Schools, by the very nature of their function, were, in the main, conservative institutions — preservers of the status quo. This began to change only when conditions about them had so altered that not to change would mean failure. One of the most important functions of supervision, then, is to continuously evaluate and revise the program of studies in light of changing social and individual needs.

Today, it is generally agreed that there are more important values in senior high school industrial arts than the mere doing and making of things. The results of several experiments point out that the most valuable experiences received were those which challenged boys to think out, study, and make definite plans to meet the difficulties involved in their problems. Where this provision was made, boys were usually better prepared to select proper materials, tools, and operations; to make calculations on materials, operations, and cost, when needed; and to carry out the other requirements which the projects seem to specify.[6]

However, for such an evaluation and revision of program to be effective, authority for its existence should come from the co-operative efforts of all personnel connected with the educational program. One of the chief criticisms against the introduction of new courses of study was that it did not always have the support of the teachers who were going to teach them.

Co-operative planning is necessary if the school is going to be an institution dedicated to the promotion of growth and development of its staff. These can be achieved through supervision by giving staff members an opportunity to initiate to plan and work out co-operatively desirable changes in the program of studies. It is part of human nature to give one's best to what one believes to be his own creation. Supervision, to be successful, and to serve most effectively in putting across changes must be able to make each person feel that he or she has contributed in the formulation of the program. In addition (and this holds true in all secondary education and particularly in the industrial-arts field), the planning and development of an educational program should include the help and guidance of the community at large.[7]

In senior high school, located in industrial towns, there should be provided three types of industrial work, namely, (1) courses which are designed for boys expecting to enter engineering colleges, or to enter industry at the semiprofessional level of technical work; (2) courses for students in co-operative part-time classes; and (3) full-time trade courses. The first type of work should include shopwork, drawing, and related technical and scientific courses. The technical phases of the subjects should be stressed, if necessary, at the expense of the mechanical phases. Manufacturing methods and problems of production should be presented in these courses. For the co-operative part-time students, both shopwork and related technical courses should be provided, the amount and character of each depending upon the part-time work they are doing in industry. The trade classes should be organized as they would be in a full-time trade school, that is, for the purpose of training mechanics. Best results will be had if the trade courses are broken up in short units.[8]

### Testing Program

Testing the results of instruction of any given area of learning is only one phase of the testing program. Another, perhaps more important, is testing the results of the entire educational program in terms of its major objectives. The latter, obviously, is the more difficult of the two because it involves the measurement of such qualities as habits,

[4] Smith, Homer J., *op. cit.*, p. 14.

[5] Boodish, H., *op. cit.*, p. 346.
Uhl, Willis L., *The Supervision of Secondary Subjects* (D. Appleton and Co., 1929), pp. 463–465.

[6] Boodish, H., *op. cit.*, p. 348.

[7] Mays, Arthur B., *The Problems of Industrial Education* (New York: The Century Co., 1927), pp. 405–406.

attitudes, appreciation, outlooks, and power of judgment, which do not lend themselves easily to being tested. Few schools attempt to set up a testing program of the latter type. Yet, the need for evolving satisfactory testing techniques in this field is becoming ever more pressing.

If a committee of supervisors, principals, and teachers is formulated to design more adequate testing techniques the majority of our testing programs would be more beneficial and more meaningful to everyone concerned in making the testing program of our schools a more workable program which would aid in improving our curriculum and instruction.

### Selection of School Personnel

To the American people the caste system is obnoxious whether it is in the army or in any other field of human relationship. The American people respect authority and superior ability, but they do not like differences in treatment of individuals based on rank or authority. Even among pupils, there is the growing tendency to regard the teacher primarily as a person superior in position but not superior as an individual.

The selective processes used in securing the faculty of any given secondary school should aim at selection of only those that are best qualified for the duties they are to perform. In industrial arts, the error has been in limited degree made in the selection of the staff to persons with a specified number of years of industrial experience related to the shopwork phase of education. Such limitations may be understandable. But there are other areas which are not so limited. In general, the qualifications of the industrial-arts teacher, whether in a high school or vocational school, should include:

1. Broad general or cultural education. This does not mean necessarily training in the classics, but of that type of education which yields an understanding of his environment and of the various forces that are constantly shaping that environment.
2. A consuming interest in young people and in their improvement. It would include the type of interest that characterizes a Y.M.C.A. or scout master worker — an understanding of human nature, youth interests, and the psychology of adolescence.
3. Leadership qualities.
4. Professional preparation in the field of work stressed.

Obviously, no one method of selection can be applicable to all schools. Such factors as size of the school, the number of teachers required, the number of pupils, the provision of advisory and auxiliary assistance, and the interest taken by community agencies are all to be considered. However, the basic philosophy, regarding supervision, involving a maximum utilization of the abilities of all personnel members, can be an ideal worth considering.

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## Helpful Suggestions for the Teacher

# Questioning—A Teaching Technique


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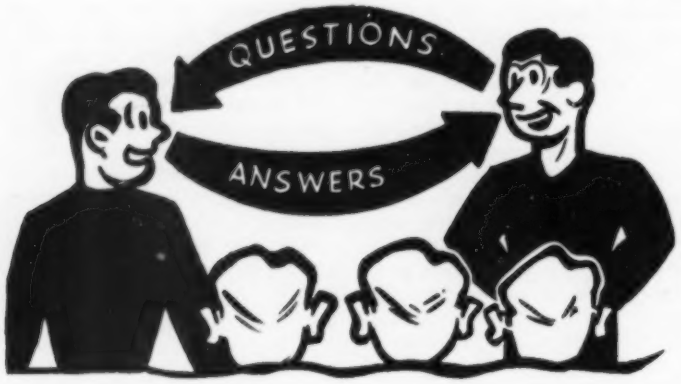
As a machinist turns a piece of steel in the lathe he listens to the sound made by the cutting action and watches the color and shape of the chips as well as the degree of smoothness behind the tool bit. Through practice he has learned to interpret these signs and to judge, at least with reasonable accuracy, how good a job he is doing. The skilled instructor does something very similar. As he teaches he watches the expressions on the faces of the students and analyzes their questions and other indications of attention and understanding.

Both the skilled machinist and the skilled instructor are quick to see when things are not going right. They seldom miss a cue, whether it is the chatter of a piece of stock in the machine or the restlessness of a group of students in the classroom, shop, or laboratory. From time to time, however, the machinist stops the machine, takes careful measurements with micrometer and steel rule, and checks his work against the blueprint. An instructor has no such accurate measuring tools but he does have a technique which, when used skillfully, can measure trainee comprehension with useful accuracy. This technique is called Questioning. Skillful questioning of students at intervals throughout the lesson is as much a part of the instructor's job as taking micrometer measurements is a part of the machinist's job. Without measurement the machinist spoils the job — the instructor fails to teach.

After each measurement is taken the machinist either continues with the cut or adjusts the machine. Similarly, if the instructor finds that the learners understand what he has covered he will go ahead with the next step of the lesson or if they do not seem to understand he may use another teaching technique, repeat the material, or use more illustrations to help put the point over.



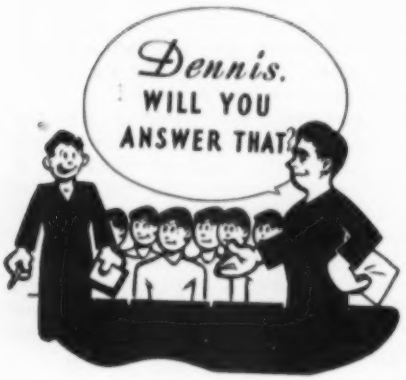

The machinist makes a final check of his work by taking accurate measurements and checking all dimensions called for by the blueprint. The instructor does much the same thing. Near the end of the lesson he asks questions which require the use of all the facts, theories, and steps of procedure covered by the complete lesson. Frequently, he gives a written test or has the trainees use the newly acquired knowledge on practical work. The following summarizes the comparison between the machinist and the instructor.

The machinist watches the color and shape of the chips, etc. Stops his work and makes accurate measurements at the proper times throughout the job. Adjusts his machine and makes the next cut. Checks the completed piece against the blueprint to see if it meets specifications. The instructor watches the expressions on the students' faces. Stops *telling* and *showing* at intervals throughout the lesson and asks well-planned questions to measure understanding. Repeats those points in the lesson that are not understood or uses other illustrations to help put the point over. Asks questions on the whole lesson to see if the trainees know and understand the facts and procedures.

The question is a good teaching tool but like other good tools it must be used skillfully. In planning for the effective use of questions we need to consider the characteristics of good questions, the types of questions that may be employed for different purposes, and the techniques of using questions. Let's discuss types of questions first.

Probably the most common types of questions are the leading, the problem, and the factual.

Leading questions are used to assist the student in thinking through to the right answer. Occasionally the instructor, finding that a student is groping for the right answer, may ask him another question to direct his attention to information he knows but is not using in answering a question. For example, the instructor might say, "What effect does friction have on temperature? All right, what does temperature do to the size of the stock? Will that increase the pressure on the lathe centers? Now what is the total effect on the lathe centers because of the heat generated by the cutting action?" Such a series of questions, although suggesting the answers, are valuable in certain situations because they cause the student to think through the problem and solve it more or less on his own. This has value when used skillfully because it builds up the student's confidence and gives him practice in using appropriate facts and theories to solve problems. Occasionally the leading question is used in a classroom situation to help the awkward student, thus saving him the embarrassment of failure in front of the class. Eventually, of course, the student must be able to find the right answers without the help of leading questions, but leading questions are very useful in the early phases of training in the application of theory to practical problems.




The factual question is one in which the student is asked to give the why, when, where, and what. Application of facts and principles are, of course, more significant than the memorization of them. However, some factual questions are appropriate at any phase of the training program. Factual questions are more common than others because they are much easier to ask and it is much easier to decide whether the answer is right or wrong.

The problem question is used to stimulate and challenge the student. The question may be used to set up a situation involving a number of factors and perhaps some controversial elements. This type of question challenges the student to make sound application of knowledge to specific problems. This type of question is the most significant and is the real measure of understanding.

### Key Words for Questions

Certain key words used in questions tend to guide the question into the most significant form. A few of the words and descriptions of their characteristics follow:

*Explain* — Requires the trainee to amplify and illustrate a subject.

*Outline* — Requires the listing of the main or key points in a logical order.

*Define* — Requires an accurate description of the limits of a subject.

*Compare* — Requires the identification of similarities and differences.

*Illustrate* — Requires the trainee to give examples of the principles or facts.

*Trace* — Calls for a step-by-step description of the growth or development of something as the flow of electrical current, gases, or liquids.

Many other words can be used in building good questions. In general, those that require the student to understand and apply information rather than to repeat it parrot-like are most desirable.

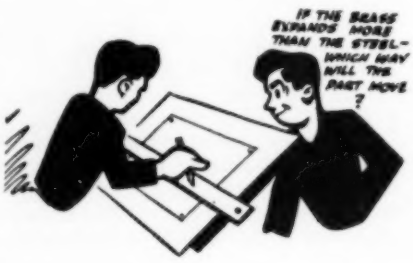
### Characteristics of Good Questions

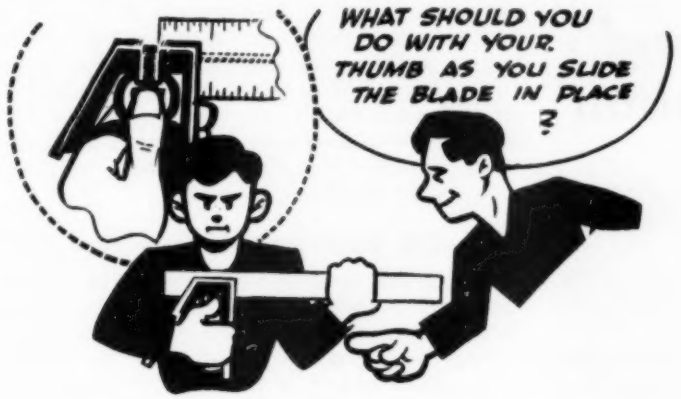
1. Easily Understood

Questions should be stated in simple, straightforward language. They should be as brief as possible yet complete enough to eliminate possibility of misunderstanding.

2. Composed of common words

Questions should be designed to meas-





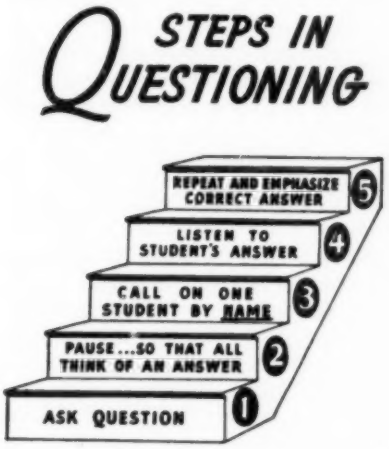

ure understanding of the subject, not knowledge of English. Trick or catch questions should be avoided.

3. Thought provoking

Questions should challenge the student to apply knowledge rather than repeat facts. Questions should not be answerable with *yes* or *no*. They should not be so easy that the answer is obvious to most students.

4. On the major points of the lesson

Questions should be built around the fundamental material in the lesson and should be asked at the proper place in the lesson to emphasize key points.




### Prepare Questions in Advance

Good thought-provoking questions are not easy to construct, and require more time than is available to the instructor during the class period. It is therefore sound practice to prepare questions on key points in advance of the lesson. One method is to identify the major or basic points to be put across in the lesson, write out comprehensive questions, and incorporate them at the proper place in the lesson plan. In using the questions during the class it may not be necessary or desirable to read them, however; having thought through and written out the questions the instructor should be able to state them with reasonable accuracy from memory after a glance at the question in the lesson plan. These carefully prepared questions should not take the place of questions which may be asked on the spur of the moment whenever the instructor feels that a question is appropriate, but they should provide a satisfactory skeleton around which impromptu questions may be asked.

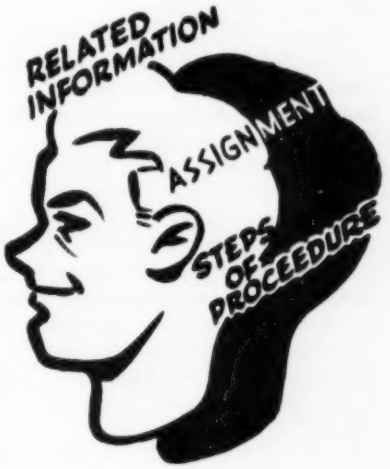
### How to Use Questions

Skillful use of questions comes with practice. However, a few basic ideas on their use can be set forth as guides. For most questions, and for those prepared in advance around major points in the lesson, a definite procedure for asking questions should be followed. This procedure requires mental participation on the part of all students and avoids the confusion that may result if the question is handled in a more informal fashion. A few other points about questions may be worth considering. Of course, an instructor should state the question as clearly as possible. To do this he must have the question well in mind before he starts to ask it. If the question is complicated it may be desirable to state it more than once, possibly varying the exact wording.

With regard to calling on individuals, some system should be employed to assure that everyone is called on with reasonable frequency. A number of systems which may appear feasible at first have serious drawbacks; for example, if members of the class are called on according to seating arrangement or alphabetical order it is quite easy for an individual to estimate when the instructor will call on him. Thus, the lazy student will not think very hard about questions until he knows that it is about his turn to answer one. Some instructors have used cards with the names of members of the class on each card. Shuffling of these cards results in alerting everyone but does not assure equal distribution of questions. Possibly the most practical approach is to call on individuals in a hit or miss fashion but indicate the number of questions each individual has been required to answer with a check mark.

Some effort should be made to fit the questions to the individuals concerned. Because individuals in a normal class will vary considerably in ability and because it is a basic principle of teaching to recognize and provide for individual differences, it is appropriate to give the most difficult questions to the most advanced students. Probably it is undesirable to indicate which you consider to be the most difficult, but a recognition of individual abilities and some effort to take this into consideration is desirable.

Student answers should be carefully evaluated so that the individual understands how much of the correct answer he was able to provide. Since individuals do not attach the same meaning to a statement, the instructor should restate the answer in such a manner as to leave no doubt in the students' minds.




Questions are essential teaching tools. Their skillful use is part of the instructor's trade.

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Machinery of America, from enormous industrial giants to delicate scientific instruments, requires vastly different lubrication methods and presents a continual challenge to oil men. As an example, electric organs won't make sweet music unless they are properly oiled. Tiny bearings in the instrument's sound generator need oil that won't *freeze up* under low temperatures. Oil engineers tested until they found a light-bodied oil that could be *piped* through silk threads from the oil reservoir to the tiny bearings. Even in a deep-freeze test at 45 deg. below zero, the unit remained operative. — *Petroleum Newsnotes.*

# *Industrial Arts and Vocational Education*

**JOHN J. METZ, Editor**

## INDUSTRIAL EXHIBITS

The school shop may well be the depository for the historical facts known or unearthed about the industrial progress of its community through the years.

Much of this kind of historical material is lost, because there is no one to record it. Sometimes, many years later, someone with a nose for news, may take the odd pieces of information that are still in existence about something that was done to originate or improve a venture in the arts, agriculture, business, or industry, and out of it try to build up a story. If that information is not gathered at the very outset, much of the real effect of the original venture is lost, and the problem of tracing it becomes increasingly more difficult as time passes.

Industry, at times, takes steps to unearth the history of its own early beginnings in some particular field. Such an effort is now being made at Saugus, Mass., where the first known iron works was erected in this country approximately three hundred years ago.

Earnest searchers have worked hard, and by the middle of September of this year a replica of the old plant with its buildings, equipment, and the iron master's house will be opened for inspection to the public.

Of course, such an enterprise is costly, for any museum costs money, not only in its erection, but also in its upkeep. No doubt, however, this renovation will arouse a great deal of interest, and will give our country an excellent picture of the enterprise of our forefathers. True, too, the production of this old plant, when compared to the output of even the smallest of our modern iron or steel mills, would compare very poorly. But the experimentation which started at Saugus three hundred years ago, makes possible the stupendous output of our steel industry today.

We owe much to those who have done the pioneer work in the professions, art, agriculture, business, and industry in our country. Any effort to give our present age a picture of how laborious was the effort that had to be put forth is very much worth while.

Probably some industrial arts and vocational education instructors would be interested in taking up some of this research in their own communities. They might discover facts that would make real historical contributions. Some of their own students may be the sons or relatives of men who engaged in some efforts to establish enterprises that have now grown up into large undertakings.

The bicycle factory, which was the forerunner of the large A. O. Smith plant at Milwaukee, was started in a small barn. A similar modest beginning was made by the founders of the Harley-Davidson Motor Company, whose huge shops are now shipping their motorcycles over the entire world.

Henry Ford also started his epoch-making automobile under such modest conditions, and numerous other such examples could be cited. Henry Ford, as a matter of fact, has set the world a fine example of a wonderful history recording effort with his famous Greenfield Village.

It would be well to have more such historical exhibits which show how some of our industries grew up. Teachers, students, and the public at large will always be interested in visiting them to learn something about the past, get information about what is being done at present, and get some ideas about what the experts are expecting of the future.

Shop instructors may want to, and some are able to help in this history portraying venture.

## THE FIRST SEMESTER OF 1954–55

At the beginning of the new semester which ushers in the school year 1954–55, it is well to think over what points are to be stressed in the classroom if the new year is to be successful for the teacher as well as for the students.

The subject matter is naturally the important point to emphasize, for that is the essential part of the teacher's job. To emphasize the right points it is well to make a careful analysis of the entire subject, and then make a similar analysis of each lesson, to highlight each point that needs emphasis so that the student will get the most out of each unit of instruction.

Having established the course outline and prepared the lessons in unit form, it is well to decide just how much time is to be spent on the related subjects, safety, applied mathematics, etc.

Most teachers will probably say, "Why, I have done this long ago." Probably they are right, too, but that may be what is wrong with their course. Course outlines may not be allowed to become antiquated.

Course outlines, and lesson outlines do not stay fresh for too long a time. They must be brought up-to-date, or at least refreshed from year to year, or even from semester to semester.

The year 1954–55 is a good time in which to emphasize safety. General shop safety naturally is important to the teacher and students who take up industrial arts and vocational education in the school. Something that deserves special attention is the care of the eyes. In some schools, unfortunately they are still too few in numbers, students are obliged to wear goggles during the entire shop period in at least some of the courses. The article titled "A Student Eye Protection Program" by Alfred S. Drew of the School of Vocational and Adult Education, West Allis., Wis., which appears on pages 217–228 inclusive in the September, 1954, issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, will be helpful to those who want to know how to inaugurate such a program in their own school.

Driver education is another safety course that deserves more attention and the school year 1954–55 offers a good chance to initiate one if your school has not done so already. Paul Bernd, educational consultant in driver education for the American Automobile Association, will no doubt be glad to lend assistance, or your state AAA division will be glad to give advice and help.

And while touching upon the subject of safety, it is well to go over the plans and equipment you have provided to protect your shop against the ravages of fire.

Eternal vigilance alone will be the best safeguard. This is especially true in the woods and finishing areas, but fire hazards also abound in the metals and especially in the automotive shops.

Many other special features for the newly started school year might be mentioned. But those that have been referred to may be sufficient to start off the new year right.

# Leaders in Industrial Education

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## HOMER JOHN SMITH

(*Continued from page 231 of the September, 1954, issue*)

### A Minnesota Survey

To return to another phase of his career, it was characteristic of Dr. Smith's approach to his new duties at the University of Minnesota that he should determine to make the department an important factor in the development of industrial education in the state. To this end one of his first moves was to inform himself as to the status of his subject in the schools.

Practically the entire academic year, 1922–23, was spent in a firsthand study of industrial departments in the public schools of Minnesota. This study included observation of classwork in shops and drafting rooms, examination of courses of study and equipments, planned conferences with instructors, supervisors, principals, superintendents, and others. The result of the year's work was "a clear picture of this special type of work in a large number of typical situations."

The purpose in view was a detailed study of the history and current practice of this work in the public schools of Minnesota. It was based on visits to schools in 65 representative cities and towns, and a thorough canvass of State Department of Education records from all school systems of the state from about 1880.

The following year a comprehensive report was published, which served not only as a basis for study and class discussion at the University, but also as a basis for modification of the teacher-training program of the department.[2] This report was a 153-page bulletin, which included 23 tables, 9 illustrations, and 7 summaries of data. In submitting his report Dr. Smith observed that some students of education appear to have little respect for studies of current practice as a background for the preparation of courses of study. However, he proceeded to set forth his reasons for considering such studies essential. It is important for us to know what is being done now, because "we can't go ahead except from where we are." Certain conclusions derived from this investigation merit attention.

1. It is probable that a community having a high school population of fewer than 100 pupils cannot offer industrial courses, except under considerable handicap.

2. State aid for industrial courses was being given to 157 towns. The state aid had been gradually diminished over the years, to a median of $411 in 1923. "This aid should now be completely denied, in the hope that a few very poor departments will be discontinued, and that the rest may be planned from premises other than minimum standards. Administrators are too prone to confuse *encouragement* and *support*."

5. We are becoming less and less a "wood and drawing" state, and more and more a state of diversified experiences.

6. The *placing* of industrial-arts subjects by grades indicates the need of more uniformity, even in the absence of proofs of effectiveness.

Five years later, in 1928, Dr. Smith conducted a follow-up survey of conditions in the schools, to determine the progress made during the five-year period.[3] A careful study of these two reports will give the student of the history of industrial education an unusually objective concept of what we mean by "movement."

### A Significant Question

At the 1932 convention of the American Vocational Association, held in Kansas City, Dr. Smith raised the question as to the validity of a conception of industrial arts which calls for such variety and extent of equipment, and such versatility on the part of the teaching staff, as to place its realization beyond the reach of any but the larger communities. He referred to studies which revealed the existence of numbers of communities, if not individual schools, which were offering in some instances from 20 to 30 different and more or less distinct shop and drafting courses.

He expressed the belief that we were scattering our energies on too wide a variety of shop subjects and courses, especially in the earlier stages. And, he asked, "Why should we not seek progress through gradual elimination, until we reach general agreement on six fundamental shop courses; each one semester in length; the same six courses to be offered, practically everywhere, in the seventh, eighth, and ninth school years?" This question has never been satisfactorily answered, and I believe it to be worthy of serious attention even today.

I referred to this discussion in my summary of the year's accomplishments, as follows:[4] "The implication is that we may be mistaken in supposing that the industrial-arts needs of boys vary so widely from community to community as the almost incredible variety of programs offered would suggest, . . . and that, in offering 12 to 16 or more of such courses,

[2]Homer J. Smith, *Industrial Education in the Public Schools of Minnesota*, Educational Monograph No. 6, University of Minnesota Press, 1924.

[3]Homer J. Smith, "Recent Changes in a State Program," ***Industrial Education Magazine***, Vol. 30, No. 1, July, 1928, pp. 10–12.

[4]Bawden, "Review of Industrial Education in 1933," ***Industrial Education Magazine***, Vol. 36, No. 1, Jan., 1934, p. 8.

our programs would necessarily yield significant additional values commensurate with the added outlay and complexity."

### A Valued Summary

A unique illustration of Dr. Smith's method of thinking and working was his summary outline of important events and personalities of the 25-year period, 1914–39.[5] As he so well said, it is important that our memories should be refreshed concerning the thoughts that have been expressed, the deeds that have been done, and the contributions that have been made down through the years. "It is the hundreds of incidents, often chance but always intertwined, that make the living stream of any movement. . . . This journal is a moving coverage of the movement — steady in its recording of our philosophy and practice, our trials and successes, our facilities and procedures."

Again this year Dr. Smith renders a similar service, and brings the record down through the ensuing 15-year period.[6] These two summaries are a valued contribution to an understanding and interpretation of what has taken place, a very real service to the busy teacher or administrator, and a guide to the thinking of the student who would comprehend the meaning of the sweep of the industrial-education movement.

### Writings

It is impossible in limited space to do justice to Dr. Smith's contribution to the profession through his writing. Under the editorship of Dr. William J. Micheels, of the Department, a committee of undergraduate students made an intensive study of this subject, and produced a 90-page Bulletin, in 1942.[7] In the "Foreword" to this bulletin, the late Charles A. Bennett, just a few months before his death, wrote as follows concerning Dr. Smith:

"He brought to his present position valuable experience as a rural school teacher, as a teacher of academic subjects and industrial arts in a medium-sized high school, as principal of an eight-room elementary school, and as vice-principal of a technical high and trade school in a large city. He brought also a balanced and winning personality.

"His professional-training record includes a normal school diploma, a Ph.B. degree from one university, and both M.A. and Ph.D. degrees from another university.

"This route to a position of leadership should be kept in mind in reading the present collection of his writings. More than most leaders in this special field of education, whether it be counted as general or vocational, he is in the strategic position of being able to view its problems as one who sees the educational system as a whole, as one who is conscious of the relationships of his special subject to the other sections of the curriculum.

"It is in this too rare capacity that one finds the source of his reputation for sound judgment concerning the vital problems of industrial education. This explains why so many of us turn to his writings to check our theories and the soundness of our practice."

[5] Homer J. Smith, "Turning the Pages," INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, Vol. 28, No. 1, Jan., 1939, the 25th Anniversary Number of the magazine, pp. 3–5.

[6] Homer J. Smith, "Turning More Pages," INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, Jan., 1954, pp. 8–11.

[7] William J. Micheels, editor, *Professional Writings of Homer J. Smith*, Industrial Arts Club, University of Minnesota, Minneapolis, 1942.

(*To be continued*)

## Suggestions by an Expert

# Silk Screen Printing for the Schools

**J. I. BIEGELEISEN**
New York City

The writer believes that five years from now there will be hundreds of schools in the United States that will offer professional courses in silk screen printing. The subject has long been added to the curriculums of a number of New York City schools and the courses in that field are growing more popular not only in the specialized trade schools but in academic schools as well. In New York City the School of Industrial Art offers a two-year professional course in silk screen printing. Hundreds of students have selected this course from among 13 other specialties which include photography, advertising art, industrial design, etc. The New York Trade School has set up an excellent shop for the teaching of silk screen work. The New York School of Printing has had day and night courses in silk screen for a long time. And there are the so-called academic schools which are becoming more and more trade-minded and one of the most interesting trades included in a number of them is silk screen. There are also several private trade schools, in successful operation in New York, that offer veteran-administration approved courses for young men and young women who want to make a career out of silk screen. The trouble seems to be that while there is an abundance of students who want to take up silk screen, there is a dearth of experienced teachers of this subject to supply the demand.

This is the story in New York. The writer does not have statistics of the number of schools or their names in other cities that have established silk screen shops for instruction in that field. However, from correspondence with teachers and directors of trade schools all over the United States, he would say that other large cities can match New York in what has been done in starting courses in silk screen and running them successfully.

The trend in that direction is growing as the possibilities of silk screen as an

art and profession are realized. The same situation prevails in Europe. There is an excellent school in Manchester, England, where silk screen is an established course among other printing crafts. Silk screen as an industrial craft is known and practiced in Cuba, Mexico, Sweden, and even in distant Australia and the newly created state of Israel. Last November's international convention sponsored by the Silk Screen Process Association showed dramatically the widespread interest in silk screen all over the world.

The job of organizing courses in silk screen and establishing shops for study and work is the task of the directors and vocational school leaders. Here's a typical letter from a teacher assigned by his principal to set up a silk screen shop in his school:

Dear Mr. Biegeleisen:

My principal is anxious to open a new course in silk screen and has assigned me the job of getting together information which will help in the layout of the shop, floor plan, essential supplies, etc. Any hints you can throw my way will be appreciated.

The answer to such a letter, if it is to be at all helpful, cannot be dismissed with a short note in reply. We shall go into some detail in this article so that others who are similarly interested may be helped. The information may also be of some value to those who plan to open a commercial establishment in silk screen production.

Here are the high lights:

### Desks and Tables

For purposes of instruction, artists' drawing desks with tops that can be tilted to any desired angle are recommended. These desks can be the standard type of drawing table or may be rigged up in such a fashion that a small screen frame can be hinged to the top and removed when not needed. A lower shelf provided for that purpose will store the frame when the desk is used for preparing the art work. In other words, this is a combination drawing and printing table.

*Lights:* Daylight fluorescent lights are recommended. These are easier on the eyes, and important too is the fact that they do not distort true color values as much as do yellowish incandescent lights. No matter how well illuminated the shop is with overhead lights there still is a need for individual desk lights. These are especially indispensable for film cutting. Desk lights should be of the goose-neck variety so that the light can be directed to fall on any desired spot. A 40-watt incandescent bulb is recommended.

*Teacher's Demonstration Desk:* This should be a larger version of the individual student desk. Whereas a 20 by 30-in. working area for students' desks is ample, for all practical purposes, the teacher's desk should be at least 30 by 40 in. On it the instructor will demonstrate the various stencil-making methods such as tusche, paper stencils, film cutting, etc. He should also be provided with a chalk board and plenty of prepared charts and diagrams showing selected items of instruction.

*Size of the Classroom:* The size of the classroom will vary with the number of students it will have to accommodate. But to give a specific idea — the writer's classroom in silk screen measures about 30 by 40 ft. and it accommodates 30 students comfortably.

*The Workshop:* The writer's experience shows that it is best to give instruction in silk screen in a double room — the 30 by 40-ft. room is for the purpose of practice in art work, film cutting, formal lectures, and demonstration lessons; the adjacent room, somewhat smaller, is a workshop where the actual printing is done on a more or less production basis. The classroom is for exploratory work, for sit-down work as well as for the presentation of theory. The shop room should be built for moving-around activity. It is there that the work should be produced on a large scale and on a quantity true-to-life shop basis.

### Shop Equipment

Three or four large printing tables are ample. These should be rigged up with a pully device and should be sturdy and meet with all commercial requirements. These tables are the master printing tables where class projects are printed on a semicommercial basis. A good size for the table base is 30 by 40 in. It will take frames of about that size but can be used interchangeably for smaller frames which should fit into the master hinges.

*Drying Racks:* Several large commercial size drying racks are sufficient. They should be movable and of sturdy construction to withstand a lot of wear and tear put upon them when they are rolled about. Metal racks are preferred to wooden ones which break easily and warp in time. A 50-shelf rack as a unit is preferred to the individual loose racks used in some shops.

*Photography Room:* Don't forget to provide a special booth or chamber for photographic stencil work. This should contain a vacuum frame, exposure lights, electric fans, storage bin for chemicals and small tools, a file for negatives, and, most important, a sink with hot and cold running water.

*Paint Closet:* A fireproof room equipped with shelves, a window, an overhead light of the vapor type recommended by the Fire Department; besides a full assortment of paints, varnishes, and thinners, such a closet should have provision for color testing and color matching. A little 11 by 14-in. test screen is a handy device for seeing what the paint will look like when printed on the stock. Most of the time the color of the paint in the can looks very different from what it looks like when it is printed on a specific stock.

Also included in the equipment of every paint room should be color catalogues of paint manufacturers, a color chart showing transparencies and overprinting, paper disks for keeping the paints from drying up, mixing sticks, and a stock of empty containers and cans.

*Cutting Machine:* A 40-in. guillotine cutting machine is ample for classroom use. The machine need not be a power press. A simple, hand-operated cutter, such as artists use in their studios, will be adequate. This should be equipped with a safety guard to prevent accidents due to inexperience or carelessness.

*Printing Press:* A letter press and proof press. This may come as a surprise to many, but from the writer's experience, it is desirable to have a large assortment of printing type, a small hand press and a Vandercook proof press. Often a poster is to be reproduced with lettering so small as to make it impractical to letter it by hand. Students should be taught the fundamentals of setting type so that they can make paste-up of printer's proofs on art work that calls for it. The proof press is used for the larger type and comes in very handy for the preparation of copy for photographic stencils. The job is set up, proofed, and used as an original for the photographer's negative. When the proof is well printed on tracing cloth or glassine paper, it can be used as a transparency for photographic stencil making.

Having a printing press and proof press around also instills students with the importance of the interrelation of the printing crafts. On some jobs it may be found feasible to do part of the job by silk screen and part of it, usually the very small type matter, by letter press. That's how it is done in industry. That's the way it should be taught in school.

*Silk Screen Printing Press:* That's a luxury item found as yet in few industrial shops but students should be taught how to operate it and when to use it. The McCormick Press, comparatively inexpensive and very versatile, is recommended for school use. Though the teacher should not encourage the habit of using his students for production jobs in quantity, yet upon gradua-

tion they should know about the latest developments in the field and the modernization of squeegeeing is one of them. So, when the budget allows it, get a press on your list.

*Storage Space for Stock:* Provision should be made for systematic storage of cardboard, paper, and other stock used in instruction and production. A filing cabinet for the safe storage of art work is a necessity as well as suitable storage facilities for sources of supplies such as samples and dealers' names for paints, silk, cardboard, etc. It is not only important that these be kept in some systematic order but that students should learn how to order supplies, what the prevailing prices are, and who the best suppliers are.

*Proof Paper Horse:* To avoid spoilage of expensive paper and board, rig up a dispenser holding a roll of white newsprint paper. This dispenser is mounted on a carpenter's horse which is equipped with wheels so that the *proof horse* can be wheeled about easily. This is an inexpensive bit of equipment which is easy to build and is a *must* in any shop, whether it is in school or in industry.

*Ventilation:* Both for safety and comfort, an exhaust fan is recommended. Paint fumes, lacquer fumes, and other undesirable odors will be banished with proper ventilation. What is more, it is in direct violation of the Fire Department and the bylaws of the various boards of education to operate a printing shop where acids and fumes are given off unless some sort of mechanical ventilation system is installed.

*Fire Extinguishers:* The city ordinance requires the installation of proper fire extinguishers in locations easily accessible — usually one in the paint room and one in the printing shop suffice. Whereas the standard paints used in silk screen are not very flammable (you can touch a lit cigarette to most paints without danger of fire or explosion), yet the Fire Department regulations require the installation of extinguishers, chemical or sand. Kerosine, turpentine, and lacquer thinners are definitely flammable and should be stored in the paint room when not in use.

*Waste Cans:* In line with fire prevention as well as for shop cleanliness and efficiency, there should be several metal waste cans with drop leaf covers for the storage of used paint rags.

There you have some forget-me-nots when you plan the layout for a silk screen shop. You will also need to supplement the equipment with a very practical course of study. And that will be the gist of a future article on silk screen for the schools.

## Getting Help From the Parents

# Public Relations Sheet Produces List of Projects

**HERBERT E. HANSEN**
Industrial Arts Instructor
McChesney Junior High School
Oakland, Calif.

One of the most overlooked phases of teaching industrial arts is that of the direct approach in public relations with the home. Here is a sheet that has been used with beginning woodshop students to introduce the parent to the woodshop program:

Dear Parent:

Your son, ——, is taking industrial arts this year at McChesney Junior High School. In the woodshop program he will study the basic practices, materials, and ways of industry. The greater part of the program is devoted to actual work with materials and tools in making small projects and articles.

In the past we have made such things as whatnot shelves, trays, barbecue implements, kitchen cutting boards, house signs, lamps, etc. Larger projects are impractical at this time due to the amount of tools, materials, and space provided in the classroom.

I would appreciate any suggestions or comments about projects or useful articles of wood that your son could make in the shop. Use the reverse side of this paper if you wish.

If there should be any problems or features concerning the shop program that you would like to discuss at any time, or if you would just like to see the shop classroom, please feel free to visit whenever it is convenient.

Very sincerely yours,
*Teacher's Signature*

This sheet has not only created a warm and friendly relationship between the home and school, but has aided materially in adding to the list of ideas and projects that are useful for the student and the home. Here is a list of ideas sent in by parents:

pipe rack
letter rack
silent butler
knife box
kitchen whatnot shelf
spice shelf
shoeshine box
letter file box
planter
steak plank
key rack
boot jack
kitchen stool
coat rack
knitting stand
napkin holder
footstool
book ends
jewelry box
pingpong paddle
television snack tray
test tube rack
lamp base
bird feeder
broom and mop rack
baseball bat rack
shadow box
bulletin board
picture frame
pot cover rack
cutting board
lazy susan
book holder
hamburger press
salad bowl
barbecue items
mailbox
scissors holder
thread box
shelf
wooden spoon
pants holder
checkerboard
cornice
pot cover rack
leaf dish
salt cellar
bread cutter
house sign
tray
magazine rack
kitchen utensil rack
sewing box
knife rack
gun rack
shoe rack
window flower box
end table
coffee table
hot plate pad
humidor
kitchen ladder
steak hammer
flowerpot holder
bed tray
tie rack
pot holder rack
candleholders

To insure the return of the sheet, the parent is requested to sign it, and credit is given to the student for returning the sheet.

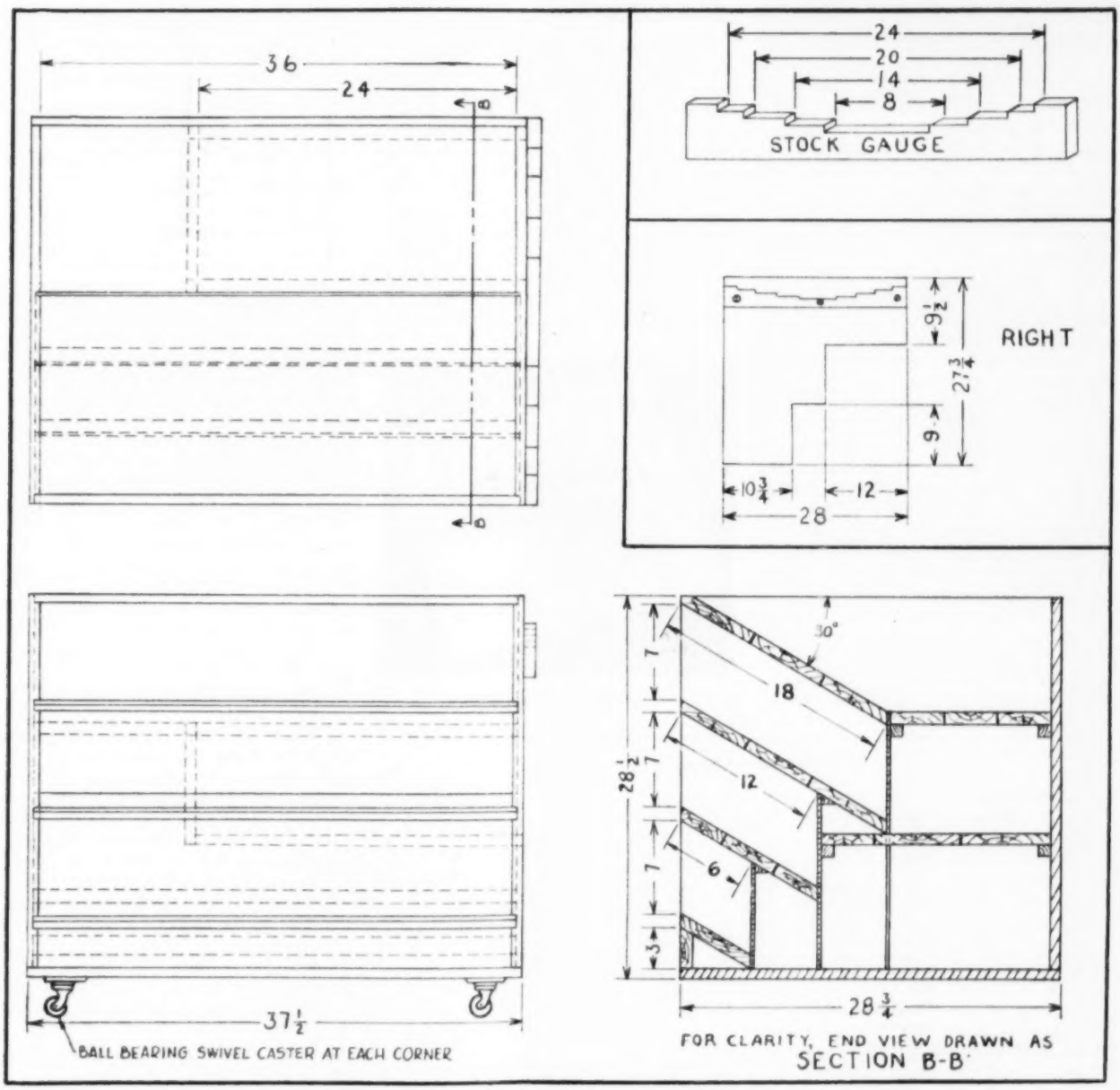
# Problems and Projects

## HANDY SHORT WOOD STORAGE BOX

**CHARLES R. BRITTING**
Industrial Arts Instructor
Holly Central School
Holly, N. Y.

The task of using up small pieces of wood has always been a perplexing problem. One reason is the difficulty in making this material readily accessible. Storage of short stock in a conventional box leaves much to be desired. Only the pieces near the top are considered for use by the pupil. Anything located more than 6 inches below the top surface is too inaccessible even to receive consideration. For all practical purposes, the space in the conventional box, from 6 inches below the surface to the bottom is wasted.

The storage box described here occupies no more space than a conventional box. It does make better use of the space by putting all material at hand, within easy use of the student. The additional time in construction will be more than compensated for, by the fact that short pieces of




Details of the handy short wood storage box

Short wood storage box

wood will be used up, thus eliminating continued accumulation. Industrial-arts students did most of the work involved in building the original model.

Grooving the two end pieces is the most difficult part of the construction. A portable electric router will be useful in this phase. Cleats may be used instead of grooves to hasten and simplify construction. The success of the finished unit will depend on the degree of accuracy achieved in preparing the end pieces. Preparation of the remaining parts and assembly of the unit does not require the use of any special woodworking techniques.

It will be seen that the principle used for storing reglets in the print shop has been used to aid in the selection of stock from this box in the woodworking shop. By knowing the depth of the various compartments, it is possible to estimate the length of a piece without removing it from storage. This system of storage makes it easy to estimate all dimensions of all wood in the box without touching any of the stock. The shorter compartments are tilted to make each piece drop to the bottom, thus insuring accurate length estimation.

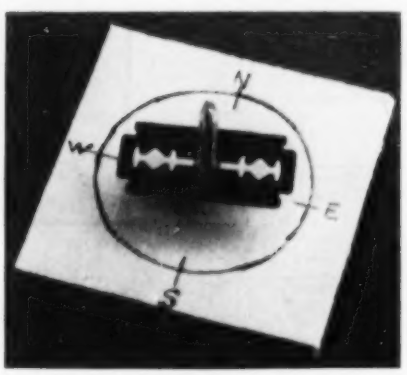
The top compartment is used to hold unsorted stock. A pupil can be assigned to periodically sort this stock and place each piece in its proper compartment. The stock gauge, mounted at the right end of the box, simplifies this operation.

Casters were added to simplify cleaning under the box. If space is at a premium, a hinged top can be added to make additional work space available. The casters afford the necessary toe room.

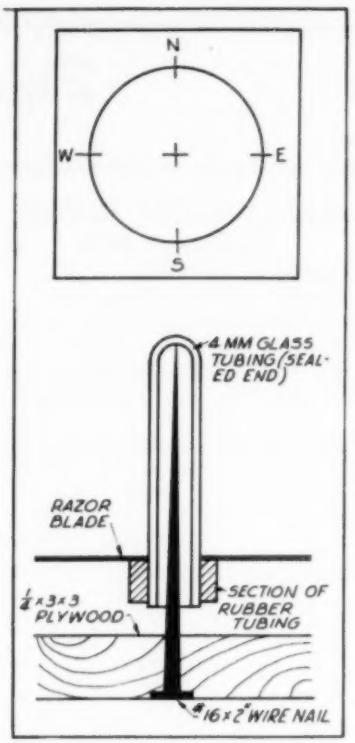
## A SIMPLE MAGNETIC COMPASS

**IRA H. JOHNSON**
State Teachers College
Mankato, Minn.

The illustrations and instruction sheet presented herewith describe a compass that has been used successfully in my junior high electricity classes. It provides an inexpensive and integrative method for explaining many of the principles of magnetism. With the exception of sealing the glass tubing, the junior high student can easily fabricate the entire project and one class period is a sufficient amount of time for construction and testing. The student not only leaves the class with a useful project but also has a practical and realistic understanding of many phases of magetism.




Magnetic compass




An inexpensive electrical project — the compass

1. Obtain the following material: 3 by 3 by ¼-in. piece of plywood; double edge razor blade; a No. 16 by 1½-in. wire nail; a piece of 4mm. glass tubing with end sealed; and a small piece of rubber tubing to fit over the glass tubing.

2. Find the center of the plywood by drawing diagonal lines.

3. Drive the No. 16 by 1½-in. nail clear through at their intersection. NOTE: Be sure to drive the nail straight and not into the table top.

4. Slide the piece of rubber tubing onto the glass tubing to the open end.

5. Remove the sharp edges of the razor blade with an oilstone.

6. Magnetize the razor blade with a permanent magnet.

7. Place the razor blade on the glass tubing by sliding the tubing through the center hole of the razor blade. Be sure that the razor blade fits at right angles to the glass tubing axis.

8. Cut out compass face from this sheet, and glue it to the top side of the wood. Use the nail to guide it into place.

9. Place the glass tubing and razor blade assembly on the nail.

10. Test.

Check your work and answer these questions.

1. Does the razor blade assembly turn freely?

2. Does the glass touch the nail only at the tip of the nail?

3. Is the nail at right angles to the board?

**BILL OF MATERIAL**

| *No. of Pieces* | *Part Name* | *Material* | *Size* |
|---|---|---|---|
| 1 | Bottom | Plywood | ¾ x 28¾ x 37½ |
| 2 | End | Plywood | ¾ x 27¾ x 28 |
| 1 | Back | Plywood | ¾ x 27¾ x 37½ |
| 1 | 6-in. Compartment back | Plywood | ¼ x 8 x 36¾ |
| 1 | 12-in. Compartment back | Plywood | ¼ x 13 x 36¾ |
| 1 | 18-in. Compartment back | Plywood | ¼ x 9 x 36¾ |
| 1 | 24-in. Compartment back | Plywood | ¾ x 9 x 12 |
| 14 | Compartment bottoms | Knotty pine | 1 x 6 x 36¾ |
| 4 | Cleats | Knotty pine | 1 x 1 x 36 |
| 2 | Cleats | Knotty pine | 1 x 1 x 25½ |
| 1 | Front base piece | Knotty pine | 1 x 3 x 36 |
| 4 | Casters | | 2 or 3 in. |
| | Wood screws | | |
| | Nails and brads | | |
| | Glue | | |
| | Finishing materials | | |

If your answer is no to any of these questions your compass is not functioning properly and corrections must be made. See your instructor for advice and help.

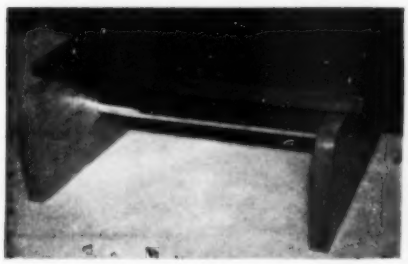
Answer the following questions.

1. Why is a razor blade a good material for a compass?
2. Why does the same end of your compass always point north?
3. If you tap the mounting board lightly why is the compass likely to change direction slightly?
4. Is a compass a magnet? Explain why you answered yes or no.
5. Explain how the razor blade was magnetized.

## MODERN RADIO OR TELEVISION STOOL

**MICHAEL HREHA**
Industrial Arts Instructor
Public School System
Centuria, Wis.

The modern design of the radio or television stool described and illustrated here, blends well with either appliance. The apparent simplicity of the design does not reveal its sturdy construction. It serves a truly functional purpose for youngsters while intently enjoying their favorite program.



Radio or television stool

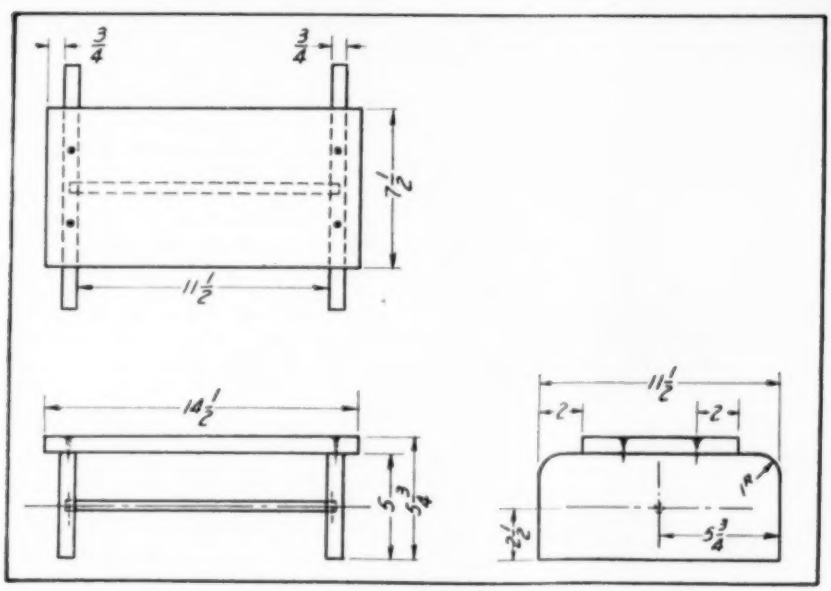
For the school shop that lacks machinery, this stool is an ideal project. It is attractive and functional, and can be built with the basic hand tools. The fundamental woodworking operations are inherent in its construction.

The top is mahogany or walnut with pine sides. The brace making the sides rigid is chrome tubing. Holes are bored from the bottom of the sides and through the tubing, *but no further*. An 8*d*. finishing nail is driven part way through the tubing and into the upper half of the sides. To further enhance the dark wood, floor glides may be used to cover the screw heads on the seat.

If chrome tubing is not available, polished thin wall conduit or brass tubing may be substituted. Another alternative is reversing the wood so the sides are darker than the seat.

**BILL OF MATERIAL**

| *No. of Pieces* | *Part* | *Material* | *Size* |
|---|---|---|---|
| 1 | Top | Mahogany | ¾ x 7½ x 14½ in. |
| 2 | Sides | Pine | ¾ x 5 x 11½ in. |
| 1 | Brace | Chrome Tubing | ½ x 12½ in. |
| 4 | Wood screws | F.H.B. | 2 in. x No. 10 |
| 2 | | Finishing nails | 8*d*. |




Modern television or radio stool

## BRASS "SCUTTLE" PLANTER

**REGINALD W. SWINYARD**
Martin Van Buren High School
Kinderhook, N. Y.

This general metal project was designed to give the student practice in low-form spinning of art metal, and radial-line development of sheet-metal patterns. It resembles a miniature coal scuttle without a bail, but a bail made from ⅛-in. diameter brass rod may be added if desired. Twenty-gauge Colonial brass is used for the project, but copper may be used in place of the brass. The photograph shows ivy growing in the completed scuttle planter.

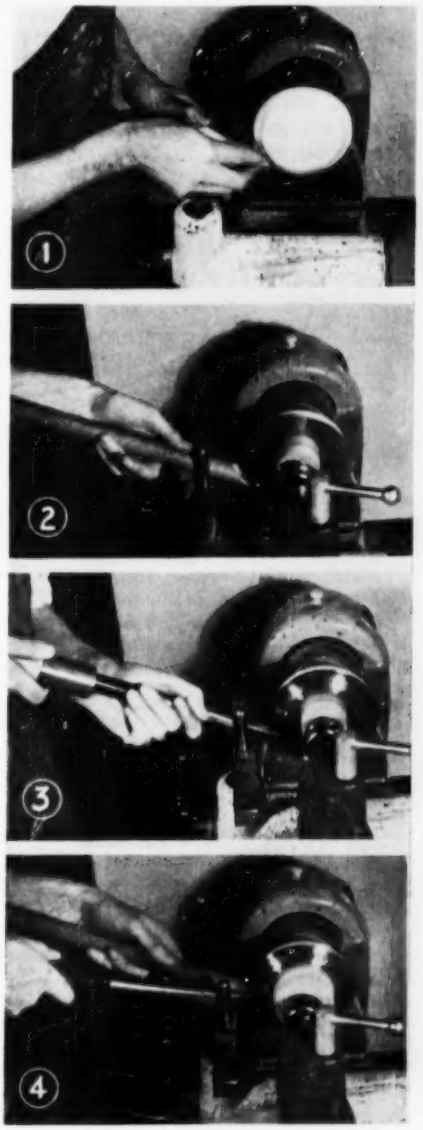
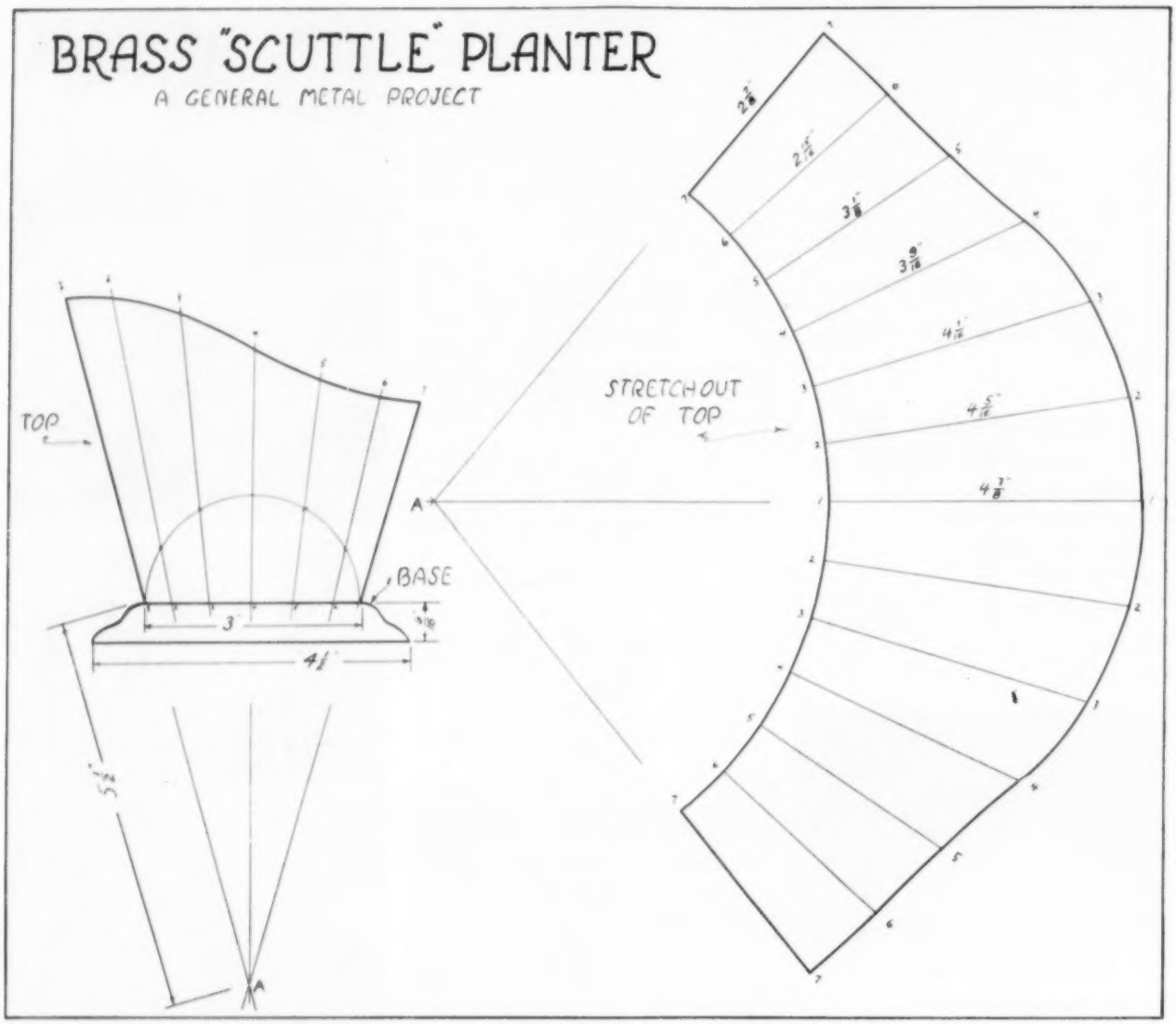



Fig. 1. Sanding chuck; Fig. 2. Centering disk; Fig. 3. Spinning over chuck; Fig. 4. Straightening rim

In radial-line development, a side view of the project is drawn, then the two sides are extended until they cross at A on the drawing. Swing a radius of 1½ in. on the base and step off the radius into 6 equal parts. This divides the top into 6 sections which are indicated by the numbers 1,1; 2,2; 3,3; etc. Make the stretchout of the top by first swinging a radius of 5½ in.




**Detailed drawing of the brass scuttle planter**

from point A. On this radius step off 12 equal segments of $^{35}/_{32}$ in. each. Draw lines outward from these points on a line with A, and measure the distances as taken from the side view, e.g., 1,1, is 4⅜ in., line 7,7 is 2⅞ in. etc., until all distances are laid out. Sketch in these points with a smooth curve, and the stretchout of the top is completed. Make a cardboard template of the stretchout.

### Construction Procedure

1. The chuck over which the base is spun, is made from a piece of hard maple ¾ by 4½ by 4½ in. This is turned down on the faceplate of the wood lathe to the shape of the base as shown on the drawing. After shaping, sand the chuck perfectly smooth with 2-0 and 4-0 sandpaper (Fig. 1). Do not use softwood for the chuck, as the grain of softwood tends to show on the metal after spinning is completed.

**The brass "scuttle" planter**

2. The maple follow block which holds the metal disk against the chuck is ¾ in. thick and 2¾ in. in diameter. It has a ½-in. hole bored through its center so that it will fit on the ball bearing spinning center which is placed on the lathe tailstock. Place the 5-in. disk of 20-gauge brass between the chuck and the follow block, and center it by eye. Be sure the metal is held tightly against the chuck by the follow block. Start the lathe on low speed and hold a broomstick handle against the revolving disk. See Figure 2. With the right hand slowly loosen the tailstock spindle until the disk runs true, then tighten the spindle again until there is no danger of the disk flying out. A face shield should be worn for this and the following operations as a safety measure. Stop the lathe.

Fig. 5. Trimming the edge; Fig. 6. Polishing base on lathe; Fig. 7. Finishing the base; Fig. 8. Cutting out top

3. Lubricate the face of the disk nearest the follow block with grease or graphite and start the lathe. Hold the spinning tool under the follow block and exert pressure against the revolving disk, working toward the outside edge, as shown in Figure 3. The long handle of the spinning tool is held against the body for support.

If the spinning is done too rapidly, the metal may wrinkle along its edge. This can be remedied by holding the backstick against the back of the revolving disk and exerting pressure upon the rim of the disk with the spinning tool. See Figure 4. The metal should be annealed if it becomes too hard to spin easily.

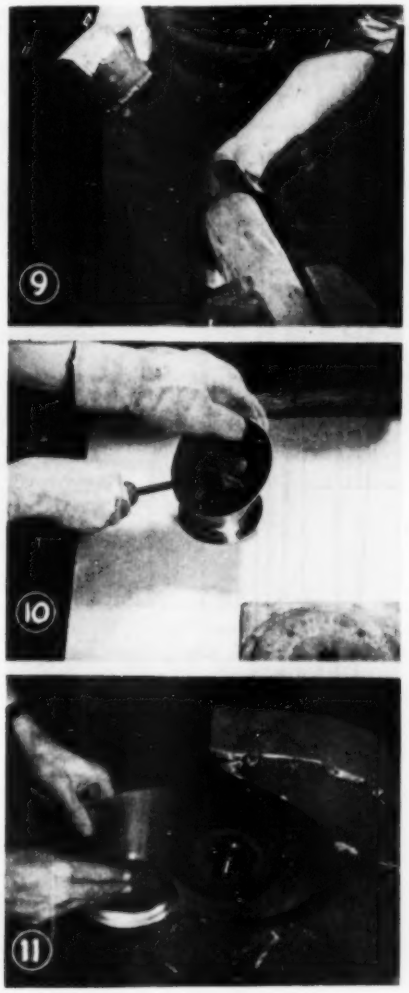


Fig. 9. Forming over stake; Fig 10. Soldering base to top; Fig. 11. Buffing the planter

4. Before the base is spun entirely over the chuck, trim the edge of the metal with the trimming tool as shown in Figure 5.

5. Wipe off the grease used for spinning, and polish the base with steel wool while it revolves in the lathe (Fig. 6). Loosen the tailstock clamp and remove the finished base from the lathe.

6. Place the full-size stretchout cardboard template of the top on the sheet brass and scribe around its edge as shown in Figure 7. The photograph shows half of the stretchout template being traced at one time; however, the top is made in one piece.

7. Cut out the top with tin snips (Fig. 8) and file the edges smooth and even.

8. Form the top over a wooden stake, using a mallet. See Figure 9. The ends must come together evenly their entire length to form a tight, even joint when soldered.

9. Clean the base and the top with steel wool and apply soldering flux. Solder the inside seam of the top first, then solder the base to the top, also on the inside as shown in Figure 10.

10. Buff the finished planter with tripoli, followed by rouge. See Figure 11. Wash with soap and water, dry, then apply two coats of clear metal lacquer.

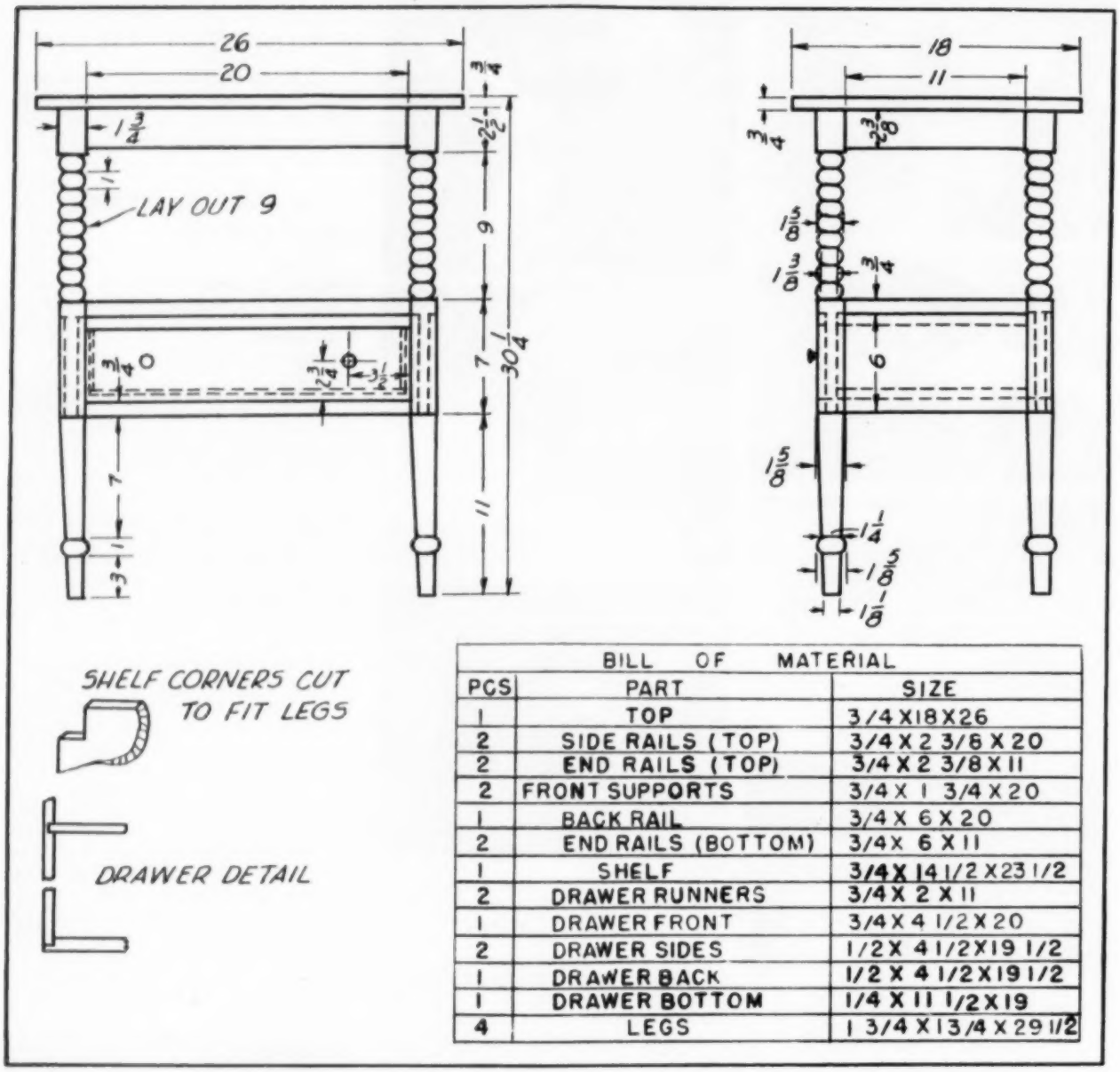
## A VERSATILE TABLE

**GEORGE BRITTAIN**
and
**GEORGE CLARKE**
Industrial Arts Department
High School
Johnson City, N. Y.

The table described herewith finds many uses in the home as a utility table, end table, serving table, and as a night stand. From a teaching standpoint it is very versatile, for it includes some simple turning and a variety of joints. You can choose the type of joints that you wish to teach according to the degree of skill of the class or of the individual. The table shown in the photograph was constructed with dowel joints. The dimensions given in the bill of materials are the actual sizes of each piece.

The stock for the legs should be cut to length. Turn all four legs; being sure to leave the parts where the rails are jointed square. Get out the stock for the rails and square to proper dimensions. Lay out and make the joints to fasten the rails to the legs. At this point you can glue the end rails to the legs. Do not glue the front and back rails at this time because you may find it difficult to fit the shelf later on. Get the stock out for the shelf and glue the pieces together. Lay out and fit the shelf by holding the front and back rails with clamps. Get the stock out for the drawer. Assemble and glue the drawer and fit it to the table. Lay out and fit the drawer runners and fasten them in place.

A table of many uses



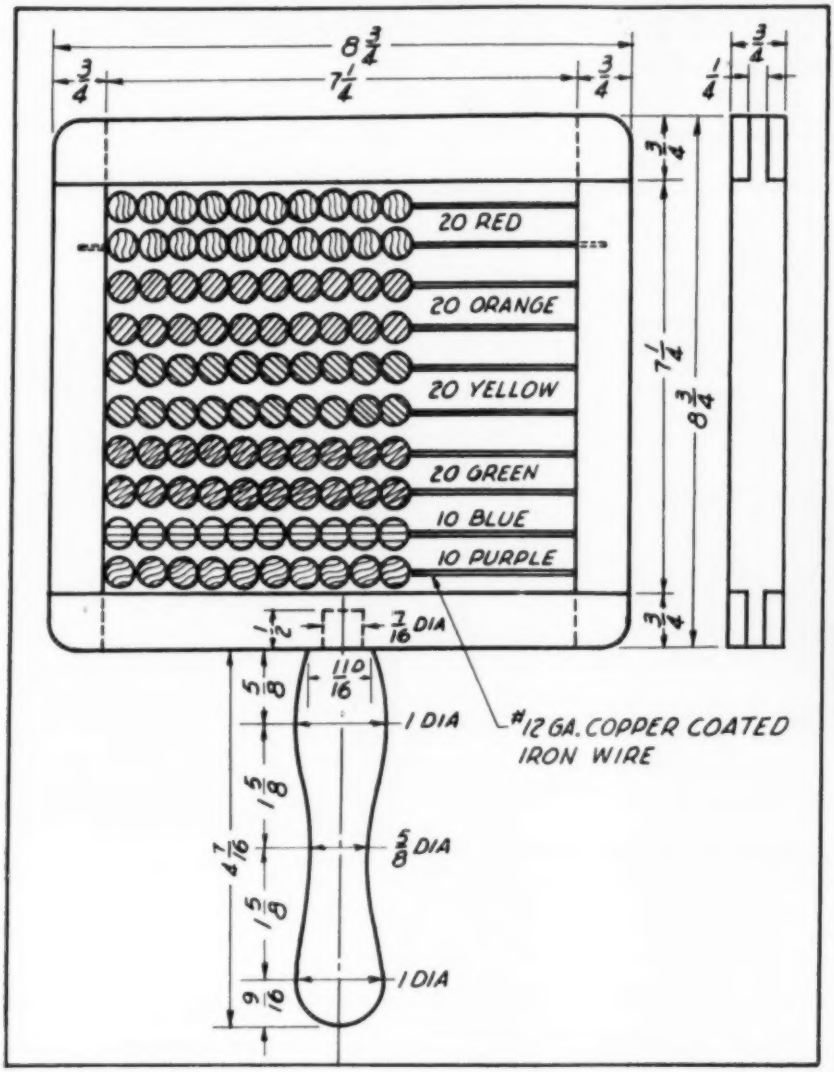

| BILL OF MATERIAL | | |
|---|---|---|
| PCS | PART | SIZE |
| 1 | TOP | 3/4 X 18 X 26 |
| 2 | SIDE RAILS (TOP) | 3/4 X 2 3/8 X 20 |
| 2 | END RAILS (TOP) | 3/4 X 2 3/8 X 11 |
| 2 | FRONT SUPPORTS | 3/4 X 1 3/4 X 20 |
| 1 | BACK RAIL | 3/4 X 6 X 20 |
| 2 | END RAILS (BOTTOM) | 3/4 X 6 X 11 |
| 1 | SHELF | 3/4 X 14 1/2 X 23 1/2 |
| 2 | DRAWER RUNNERS | 3/4 X 2 X 11 |
| 1 | DRAWER FRONT | 3/4 X 4 1/2 X 20 |
| 2 | DRAWER SIDES | 1/2 X 4 1/2 X 19 1/2 |
| 1 | DRAWER BACK | 1/2 X 4 1/2 X 19 1/2 |
| 1 | DRAWER BOTTOM | 1/4 X 11 1/2 X 19 |
| 4 | LEGS | 1 3/4 X 1 3/4 X 29 1/2 |

A table of many uses by George Brittain and George Clarke, Johnson City, N. Y.

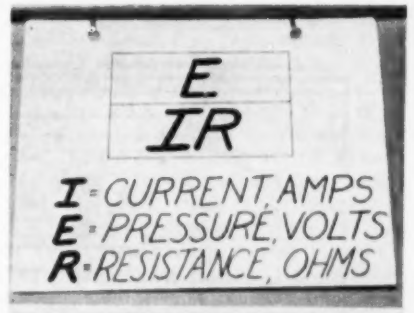
You are now ready to glue up the front and back rails. You should be sure to have the shelf placed in position, for you may find it difficult to insert it after the front and back rails are glued. Fasten the shelf to the rails. This may be done with the various kinds of table top fasteners but the table shown has the shelf as well as the top fastened with dowels. This is easily accomplished with the aid of dowel centers. Bore the dowel holes in the rails and then place the dowel centers in these holes; then set the piece to be doweled in position and press it to the dowel center. The center for the new hole will be marked on this piece. Then drill these dowel holes.

Square up the table top to size and fasten it to the table. All pieces should be scraped and sanded before assembly so that there is a minimum amount of sanding to be done once the table is assembled. Drawer pulls will be necessary. These may be turned on the lathe or they might be purchased from your local dealer depending upon your choice. Your hardware dealer, more than likely, has many styles to choose from.

Give the table a final cleaning and sanding and you are ready for the finishing process. If the project is made of open grained wood it will need to be filled with paste filler. If you are going to stain the table, you should now apply stain. After the stain you are ready to apply several coats of finish (varnish, shellac, lacquer, or penetrating seal). We have had unusual success in our shop with the penetrating seals. We have found that to get a good job it is necessary to apply a minimum of four coats of sealer, allowing to dry overnight and steel wooling each coat before the application of the next coat. The final coat is rubbed with pumice stone and oil. Finish the project by applying two coats of a good grade of paste wax.




The abacus submitted by Rozell C. Smith, vice-principal and industrial-arts instructor, School District No. 11 (Trail), Fruitvale, B. C., Canada



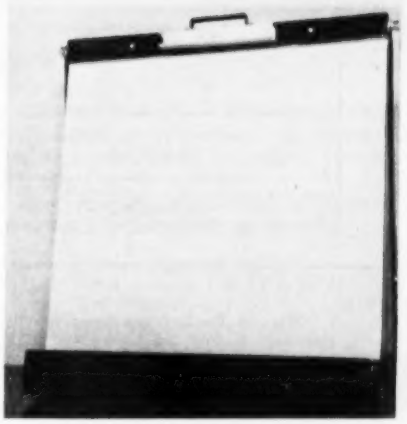


Fig. 1. (top). A new use for paper fasteners

Fig. 2 (center). Magnets being used to display cards on squaring shear

Fig. 3 (bottom). Portable chalk board with magnetic toolholder

# HELPFUL TEACHING AIDS FOR INDUSTRIAL EDUCATION

**HOWARD R. SCHRAMM**
Industrial Arts Teacher
High School
Shadyside, Ohio

Teachers of industrial arts and vocational education are continuously faced with the problem of finding and developing new and better ways of presenting material to their classes. The author has found the four following aids to be most helpful and effective.

### A New Use for Paper Fasteners

Have you ever been faced with the problem of displaying drawings, charts, posters, and the like on the chalk board? Paper fasteners with the pointed end inserted under the molding at the top of the chalk board as shown in Figure 1, serve nicely to hold drawings, charts, and the like to the chalk board while presenting a lesson. Students' drawings may also be displayed in this manner. Cardboard or paper may be quickly fastened to the board to cover material which you do not want to erase.

### Magnetic Card Holders

How many times have you been presenting a demonstration around a machine and have marked various parts with chalk or a china marking pencil? Confronted with this problem, the author secured small permanent magnets around which were wrapped narrow strips of tin plate and shaped so that a card could be easily inserted. Or, small magnets called Maggie,[1] which are designed to hold cards, were bought.

The names of various parts of machines or tools were printed on 3 by 5-in. cards or on poster board cards if a heavier card is desired. The cards may be covered with cellulose acetate or given several coats of clear lacquer to keep them from becoming soiled. The cards are easily stored in a 3 by 5-in. card file box.

[1]Can be secured from: Magnetic Merchandising Inc., 40 East 32nd St., New York 16, N. Y.

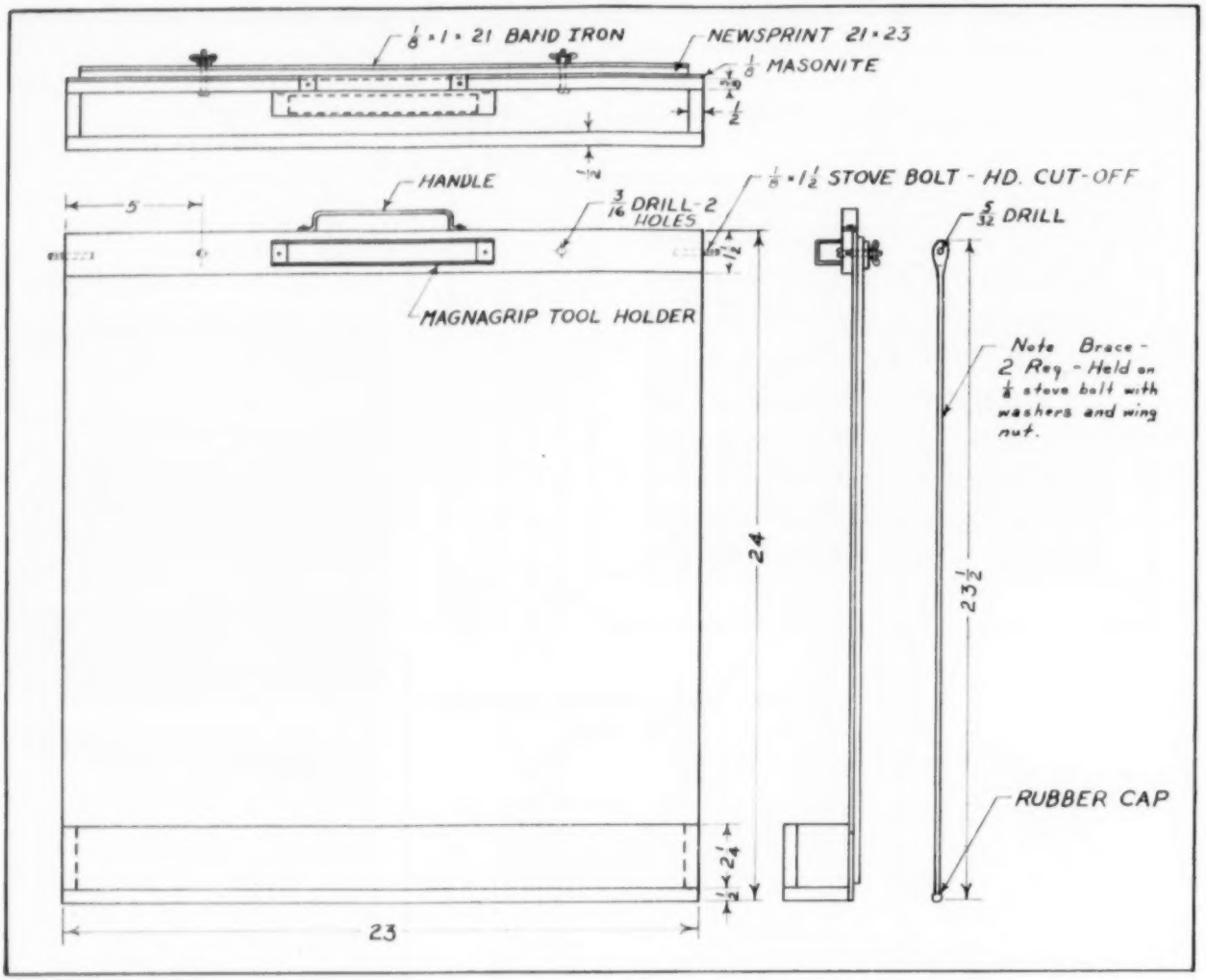

1/8 • 1 • 21 BAND IRON
NEWSPRINT 21 • 23
1/8 MASONITE
HANDLE
3/16 DRILL-2 HOLES
1/8 • 1 1/2 STOVE BOLT - HD. CUT-OFF
5/32 DRILL
MAGNAGRIP TOOL HOLDER
Note Brace - 2 Req - Held on 1/8 stove bolt with washers and wing nut.
24
23 1/2
RUBBER CAP
23

Fig. 4. A portable chalk board

Students are fascinated by this novel and effective means of presentation. Figure 2 shows the magnets and cards being used on a squaring shear.

### Chalk Board With Magnetic Toolholder

Have you ever been giving a demonstration around a bench or machine and have used the bench top or a board as a chalk board? Yes, there might be several chalk boards in the shop, but they are not portable. Faced with this problem, the author constructed a simple, but effective, portable chalk board with a magnetic toolholder on one side and an illustration board on the other side.

A piece of ⅛-inch Masonite or ¼-inch plywood 23 by 24 in. in size was used for the chalk board. See Figures 3 and 4. A small box was attached to the bottom to hold chalk, eraser, chalk compass, ruler, and the like. A 1½-in. strip of ⅜-in. plywood was fastened to the top to hold a Magnagrip Toolholder.[2] The magnetic toolholder is quite handy to display small hand tools while presenting a demonstration. Three coats of green chalk board paint[3] were applied to the Masonite and the top strip and box were painted black.

[2]Can be secured from: Phelon Magnagrip Co., East Longmeadow, Mass.

[3]Can be secured from: Endur Paint Co., Inc., 75 North Street, Boston 8, Mass.

**BILL OF MATERIAL**

| Quantity | Material | Size |
|---|---|---|
| 1 | Masonite | ⅛ x 23 x 24 |
| 1 | Plywood | ⅜ x 1½ x 23 |
| 1 | Plywood | ½ x 2¼ x 23 |
| 1 | Plywood | ½ x 2½ x 23 |
| 2 | Plywood | ½ x 2 x 2¼ |
| 1 | Band iron | ⅛ x ½ x 6½ |
| 2 | Round iron | 5/16 x 23 x 23½ |
| 1 | Band iron | ⅛ x 1 x 21 |
| 2 | Stove bolts | ⅛ x 1½ R.H. |
| 2 | Stove bolts | 5/16 x 2½ R.H. |
| 2 | Wing nuts | ⅛ |
| 2 | Wing nuts | 5/16 |
| 2 | Rubber caps | 5/16 |
| 6 | Washers | ⅛ |
| 1 | Magnagrip Toolholder | |
| | Green chalkboard paint | |

The back consists of an illustration board, as shown in Figure 5. This is a piece of 21 by 23-in. newsprint attached to the top by a piece of ⅛ by 1 by 21 in. band iron through which are drilled two holes and fastened with bolts and wing nuts.

The handle is made from a piece of ⅛ by ½-in. band iron which serves as a hanging bracket as well as a carrier.

The two braces, which serve as an easel, are made from two pieces of 5/16-in. round rod 23½ in. long. One end is flattened out, and is drilled with a 5/32-in. drill. The braces are held on ⅛-in. stove bolts (the heads of which have been cut off) with washers and wing nuts. Rubber caps can be placed on the ends of the braces. If rubber caps are not available, electrical wire nuts may be used.

Colored chalk, china marking pencil, or crayons can be used on the illustration board. Prepared drawings, charts, and the like can also be used.

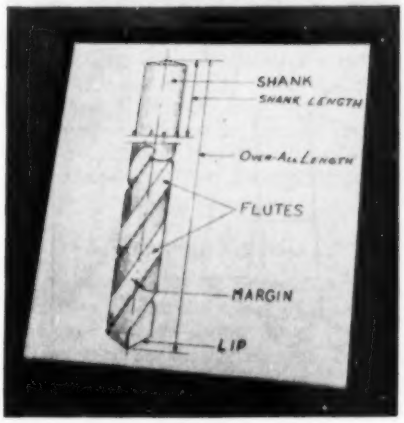



Fig. 5 (top). The illustration board

Fig. 6 (bottom). Using cellulose acetate on the illustrational board

### Cellulose Acetate and China Marking Pencils

Have you ever wished that you could easily and systematically reveal the various parts of tools and machines as you proceeded with the presentation of the nomenclature? One way the author has solved this problem is by preparing drawings of various tools and machines but omitting the names of the parts. The drawing is covered with clear cellulose acetate. The illustration board, mentioned previously in this article, serves nicely for mounting the drawing and the cellulose acetate. See Figure 6.

As the teacher proceeds with his presentation, the names of various parts can be printed on the cellulose acetate by using a black china marking pencil. Listo marking pencils[4] also can be used for this purpose. Various colored china marking pencils can be used for emphasis.

The primary advantage of this method is that the drawings can be used over and over again. The china marking pencil markings can be easily removed from the acetate and the drawings can be used for review or test purposes.

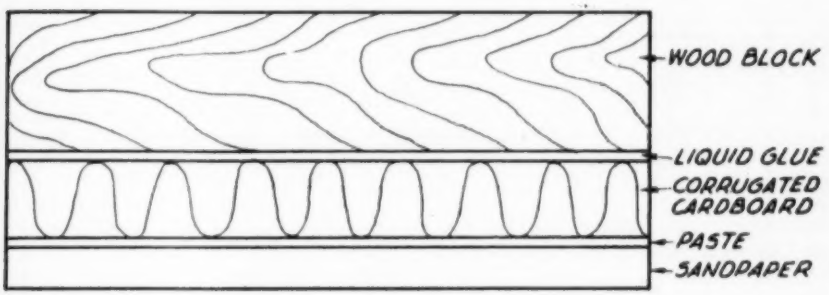
[4]Manufactured by: Listo Pencil Corporation, Alameda, Calif.

## HANDY SANDING BLOCK

**GEORGE V. CARDINALE**
Woodworking Instructor
Roosevelt Junior High School
Erie, Pa.

The sanding block described herein, has been used in our junior high school woodworking shop for the past three months.

The sanding block has been made by the pupils and has proved to be an effective method of reducing problems which arise from using sandpaper. The materials used were readily available and inexpensive. The wood blocks were salvaged from the scrap box. The corrugated cardboard provides the soft surface usually attained by using rubber sheets.




A handy sanding block

## BUILD AN ENAMELING KILN

**KENNETH GOGEL**
Campus Laboratory School
Iowa State Teachers College
Cedar Falls, Iowa

You can build this inexpensive enameling kiln. The only tools needed for its construction are a compass, a screw driver, a knife, a flat chisel, a coping saw, and a wood file.

Home-made enameling kiln

This kiln has several advantages other than its low cost. It is heavy enough to be stable. It is durable and will stand hard usage for several years. It will heat up to 1500 deg. F. in 20 minutes with a 600-watt element. It will hold an even temperature. The top can be lifted straight up and will seldom interfere with the piece being fired.

A high quality refractory cement is one of the key materials in making this kiln. The cement should form a strong refractory joint and serve as a coating to prevent wearing of the firebrick. Your local refractory dealer or furnace repairman may suggest a cement that is satisfactory.

Many of the parts can be salvaged. The heating element and prong plug can be removed from an old waffle iron. Salvaged insulating bricks will be satisfactory if they do not have glazed surfaces. An insulated appliance cord should be used to operate this kiln.

The following list provides the approximate price of the needed items:

| | | |
|---|---|---|
| 1 can | Refractory cement that will set before firing and be brick hard after firing | $ .95 |
| 7 each | Insulating firebrick, size 2½ by 4½ by 9 in., 2000 or 2600-deg. type @ 35 cents each | 2.45 |
| 1 each | Heating element in a porcelain base, 4-in. diameter, about 600 watts | 2.00 |
| 1 each | ⅛ by 2½-in. bolt and nut | |
| 1 each | Brass, stainless steel, or iron machine screw and nut. Cover the top of the iron screw with cement to prevent scaling | .10 |
| 1 each | Insulated appliance extension cord with switch | .75 |
| 1 each | Sheet iron handle | .15 |
| 4 each | Flat or roundhead wood screws to fit handle holes, No. 8, 9, or 10, 2½ in. long | .10 |
| | *Total* | 6.50 |

### Cementing the Bricks

The bricks for the kiln are prepared for cementing by sliding the edges together and back and forth to form a smooth surface. See Figure 1. Then tap the rubbed surfaces on a paper-covered table or remove the dust with a bellows. Mix the cement to a creamy consistency by adding 1 part water to 6 parts cement or follow the manufacturer's directions. The cement

FIG (1) CEMENT THREE PAIRS OF BRICKS. SLIDE EDGES BACK AND FORTH TO SMOOTH THEM. DUST THOROUGHLY. SLIDE BRICKS TOGETHER ON A LEVEL SURFACE AFTER DIPPING EDGES IN CEMENT

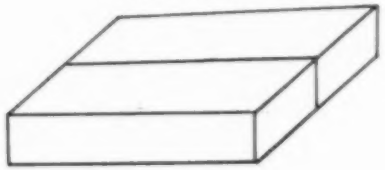
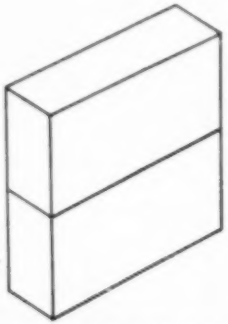


FIG (2) STAND BRICKS ON END AND TAP GENTLY WITH A BLOCK OF WOOD TO SETTLE CEMENT. SCRAPE OFF CEMENT ALONG THE JOINTS. DRY ON EDGE OVER NIGHT.



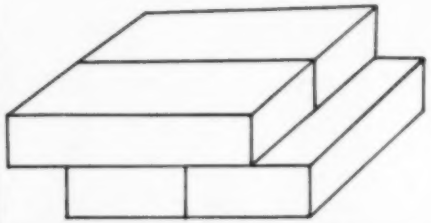


FIG (3) SLIDE CEMENTED BRICKS BACK AND FORTH TO LEVEL THEM. DUST THOROUGHLY. DIP OR POUR CEMENT ON SURFACES, AND SMOOTH WITH A BRUSH. SLIDE BRICKS TOGETHER AND TAP GENTLY DRY OVER NIGHT.

FIG (4) DRAW A CIRCLE WITH A DIAMETER SLIGHTLY LARGER THAN HEATING ELEMENT.
DRAW A CIRCLE WITH A DIAMETER 1½ INCHES LARGER THAN HEAT. ELEM. DIA. STEP FOR CENTERING TOP.
SCRAPE OUT FLAT BOTTOM HOLE FOR HEATING ELEMENT.
DRAW A LINE ¼ INCH BELOW THE TOP EDGE ON EACH SIDE.
SCRAPE THE SURFACE BETWEEN THE OUTSIDE CIRCLE AND EDGE DOWN TO THE LINE

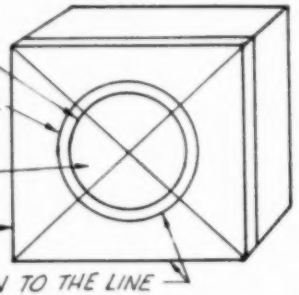


FIG (5) MAKE A RECTANGULAR HOLE FOR THE ELECTRICAL PLUG.

SAW OUT BASE PIECE.

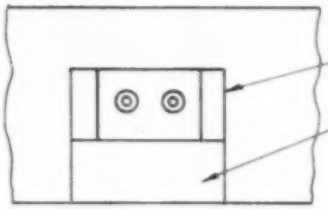
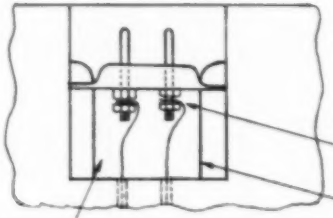
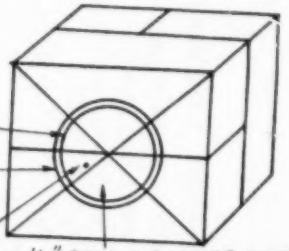


FIG (6) DRILL TWO HOLES FOR WIRES FROM THE HEAT ELEM. PUSH WIRES THROUGH HOLES. TIGHTEN NUT ON HEATING ELEMENT BOLT.
WRAP WIRES CLOCKWISE AROUND SCREWS. TIGHTEN NUTS.
CEMENT FIRE BRICK STRIP IN PLACE.



PACK INSULATION BEHIND PLUG.
CEMENT FIREBRICK PIECE IN BASE.

FIG (7) DRAW A CIRCLE SLIGHTLY LARGER IN DIA. THAN HEATING ELEMENT.
DRAW A CIRCLE WITH DIA. 1½ INCHES LARGER THAN PREVIOUS CIRCLE.
SCRAPE A 1¼" DEEP HOLE FOR FIRING CHAMBER



DRAW A LINE ¼" BELOW SURFACE IN THE HOLE. SCRAPE ¾" STRIP TO THE LINE.

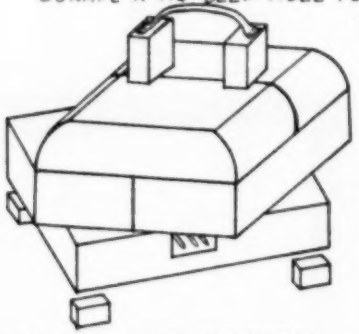


FIG (8) ROUND ALL CORNERS WITH FILE. CEMENT HANDLE BLOCKS. THEN DRY.
DRILL SCREW HOLES AND TEST SCREWS FOR FIT.
TWIST COVER GENTLY BACK AND FORTH TO LEVEL SCRAPED SURFACES.
DUST SURFACES AND APPLY CEMENT COAT TO BOTH SURFACES WITH A BRUSH. TWIST GENTLY WHEN CEMENT IS SEMI-DRY.
CEMENT ON FOUR LEGS.

TO FINISH KILN:- APPLY A LIGHT COAT OF CEMENT TO ALL UNCOVERED BRICK SURFACES. DRY FOR TWO DAYS.
PRE-HEAT KILN FOR FIVE TO TEN MINUTES AND COOL. KILN IS THEN READY FOR USE.

Construction hints for making an enameling kiln

can be applied quickly and evenly to both edges of the bricks by dipping them. The edges of the brick should then be slid together while the bricks are on a table. The bricks are then placed on edge and tapped lightly with a wood block to settle the cement. See Figure 2. The excess cement should be scraped off all around the joints and the bricks should be carefully placed where they can dry overnight without being disturbed. If the damp joint breaks, scrape off the cement and begin again. The cement joints become hard overnight and are difficult to smooth without scraping into the soft brick.

Two more pairs of bricks for the top cover are then cemented edge to edge in the same way. The following day the two layers of the bricks for the top cover of the kiln can be slid back and forth over one another, with the cement joint at right angle to each other, to make a smooth surface for cementing. See Figure 3. The bricks should fit together without rocking. Remove the dust from the surface before applying cement. Slide the bricks together, tap gently, and dry overnight.

### Preparing the Base

The next step is the preparation of the kiln base. Locate the center of the bricks and draw a circle slightly larger than the diameter of the heating element. Draw a second circle with a diameter 1½ in. larger, as shown in Figure 4. The area inside the first circle can now be scraped out. This hole should have a flat bottom for the heating element. The element can be even with the surface of the base or slightly higher. Mark a line ¼ in. below all around the top edge of the bricks. Evenly scrape the surface of the brick to the line. This will leave a ¾-in. wide step. It will be ¼ in. high all around the element. This step will cut down the heat loss and serve as a guide for centering the cover.

The bricks can also be cut easily by clamping guide blocks on a drill press table and using a fly-circle cutter.

If a coiled element wire from an old waffle iron is available, a spiral channel can be scraped out in the surface of the brick. Staples made from pieces of element wire can be slipped at intervals over a wire of the heating coil and will hold it in position. The open heating coils need to be covered with cement.

A hole for bolting in the element can be made through the base by twisting a ⅛-in. rod or screw driver through the brick. If the bolt extends through the base, cover it by cementing a cap of firebrick over the end.

### Mounting the Electrical Plug

A hole for the electrical plug can be scraped in one of the sides of the base. See Figure 5. Choose a side without a joint. The length of the lead wires from the heating elements will determine how deep the hole must be. A ¾-in. piece of lead wire beyond the plug screw is needed to make the hook that will fit under the screw. See Figure 6. The support for the prongs of the electrical plug will need to be porcelain to stand the heat.

A coping saw can be used to saw out a piece of firebrick at the bottom of the plug hole. A pair of holes for the lead wires running from the base of the heating element to the plug can be made by twisting a ⅛-in. rod with a beveled edge through the brick until it joins the plug hole. The space behind the plug should be packed with brick dust. Apply cement to the edges of the firebrick piece just removed, and the edges of the hole, and cement in the piece. The electrical plug in the base can be held in place by cementing strips of firebrick along the edge. Be sure to arrange these strips so they will not interfere with the appliance cord plug.

### Preparing the Cover

The firing chamber in the cover is the same diameter as the heating element hole in the base. See Figure 7. Draw a second circle with a diameter 1½ in. larger. The area within the first circle will be the firing chamber and can be 1¾ in. deep. Draw a line ¼ in. below the surface of the hole. Scrape the strip between the hole and the outer circle to make room for the base step to fit into the cover.

The cover and the base can be made to fit tightly together by rotating the cover back and forth while the base is held firmly. This movement will even the surfaces. A coat of cement on these surfaces will fill in the low places and can be evened in the same manner while the cement is damp.

Blocks of firebrick can be cemented on the bottom of the kiln for legs. See Figure 8. Blocks of firebrick about 1½ by 2 by 2 in. can be spaced and cemented on top of the cover to support the handle. When the cement is hard, narrow holes for the wood screws can be drilled. The screws should be screwed into the holes to check the fit. Soft cement can then be put in the holes and the handle screwed in place.

Use an old wood file to round all the sharp edges of the brick. A saw can also be used to cut off the edges before filing or scraping them round. The final step is to apply a thin, even coat of cement to all uncovered surfaces of the kiln.

### Test Firing

When the cement is thoroughly dry, at least two days, the kiln should be prefired for five or ten minutes and allowed to cool. The kiln is then ready for use.

You should expect the cement coating to crack in several places as the heated bricks expand. This will not affect the usefulness of the kiln. A sheet of asbestos cement board, slate, or similar fireproof material should always be placed under the kiln during firing. Always disconnect the kiln by pulling the cord at the wall outlet.

## JET PROPELLED TOY BOAT

**J. W. BOLLINGER**
**Tulsa, Okla.**

This boat, made as illustrated in the picture, is really "jet propelled"; propelled by the air as it escapes out of the rubber balloon into the water. Works swell!

Enlarge the pattern shown to the desired size by using suitable squares, preferably ½-in. squares.

Straighten out the body part of a large tin can, trace the pattern, cut out the tin, bend, and solder together. File smooth.

To hold the rubber balloon in place, and to allow the air to escape into the water, make a tin tube ¼ in. inside diameter and about 1 in. long. To make this tin tube, roll an inch-wide piece of tin around a short length of ¼-in. round rod. Solder edges together.

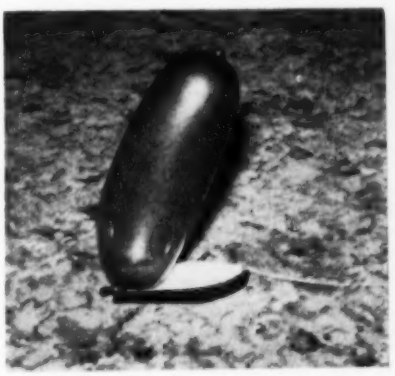
Drill a ¼-in. hole in the center of the back of the boat, near the bottom, and solder the tin tube in place, at a slight angle, as shown in the front view. A little experimenting will help determine the best angle.

Slip the neck of the rubber balloon over the inside end of the tin tube and tie it firmly in place with a piece of string.

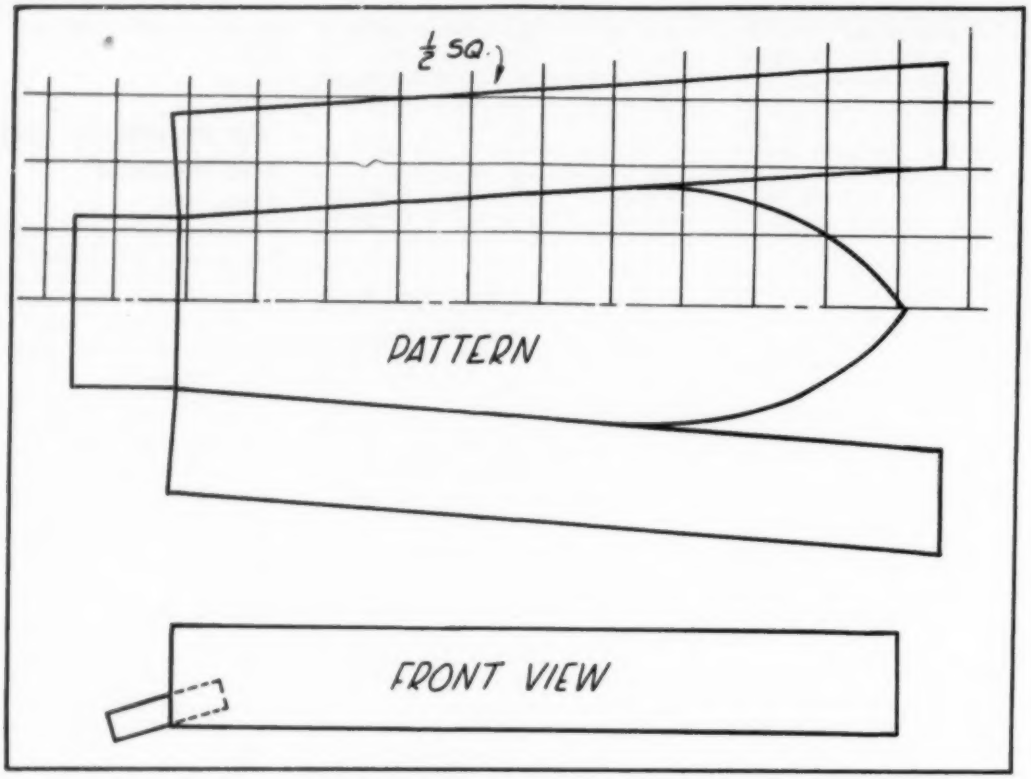
Blow the balloon up by way of the tin pipe, hold the pipe shut with the finger, and place the boat (and balloon) in the water. The air will escape rather rapidly and the boat will make a sudden spurt forward — like a speed boat.

To slow down the boat, take a round eraser out of the end of a lead pencil, and drill a 7/64-in. hole through it, lengthwise. Insert this eraser into the tin tube after blowing up the balloon and before placing the boat in the water. The air will now escape more slowly, and the boat will "put-put" along over quite a distance.

A small keel soldered to the bottom near the back end of the boat will help to keep the boat going straight.



Jet propelled toy boat




Detailed drawing of the jet propelled toy boat

Various decks, masts, and smoke stacks may be added.

A string tied to the bow of the boat will help in guiding and in retrieving the boat.

Water in the family bathtub will prove to be an excellent race course.

## BRINGING THE WOOD LATHE TO THE FRONT

**MARSHALL H. ENSOR**

Industrial Arts Instructor

High School

Olathe, Kans.

The turning lathe was one of the first machines to be used in the working of wood. Its use in the industrial-arts shop is being neglected because of new shapers, routers, and surfacers, which are now attracting attention. The lathe is far safer than the circle saw or jointer and more fascinating to operate. When working on the wood lathe one has a chance to form, shape, and carve with his own hands and still have the aid of power.

Many things can be learned from lathe work: The action of centrifugal force, momentum, and inertia; association of speed, power, and vibration; grinding and cutting action of lathe tools, and methods of manipulating them are some of the units which can be effectively learned. More can be learned about how trees grow, wood texture, and design from lathe work because the worker comes in closer contact with those things than by pushing a board through a surfacer which has been previously conditioned, set up, and adjusted by the instructor.

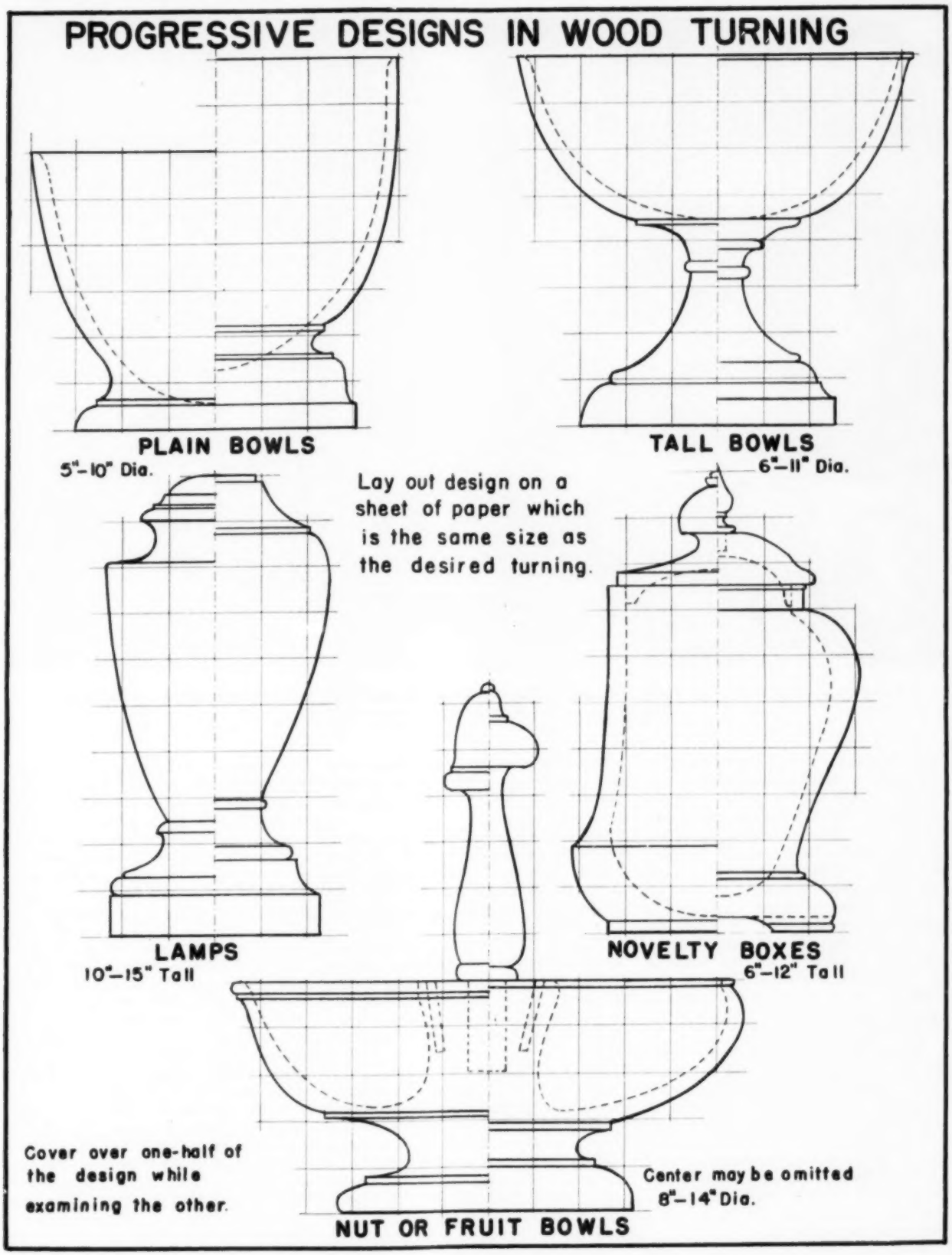
Some folks think that spindles and pin trays are all that a lathe will make because it is so difficult to get a large piece of seasoned wood which has not checked. Sometimes large pieces are glued up and novel effects obtained but losing all of nature's beautiful graining of the wood.

Large pieces can be obtained for lathe work by just taking cross sections of trees and working them to shape before they have time to check. Halves and quarters can be worked in some cases if uneven drying and shrinking is not too objectionable. Crotches may be worked transversely on the lathe and show up the beauty nature has woven into the wood to hold the two branches together. Walnut and ash are very desirable woods but any mature tree may give very good results. Young trees have more sap which adds a problem. Best results seem to be obtained if the tree has been cut for a year with the mark remaining on it, in order to prevent checking. A dead tree which still has the bark when cut has been found to give some wonderful pieces for turning. For best results, paint the ends of the log to prevent rapid drying while the logs are seasoning before turning.

In centering up a longitudinal section most designs will require the lathe centers to be driven in the tree center or very near it. If the log is too large for the lathe an ax will have to be used to remove the surplus, and balance its weight so that it will not be thrown when starting to turn. Often a lathe can be slowed lower than its first speed by cutting rapidly to slow the motor or slip the belt. A big sharp gouge will cut shavings like a small veneer mill from the green log.

The dead center end is then faced off with the spear point for a faceplate. The faceplate should be fastened on securely with six or eight 2-in. No. 14 wood screws. A coat of dope or varnish can be added to the end of the log to help seal the plate fast. The dead center should be run against the end of the log while the gouge, round nose, and parting tool are used to rough out the general shape of the bowl. The lid for small boxes can be made with the inside out next to the dead center but large boxes require the end of the log to be cut off and another faceplate put on it. While roughing out a piece, sometimes the design has to be changed slightly or moved up or down the log because of some hidden defect which must be missed.

Lids should be turned on the inside and as much on the outside as is convenient when wood finished. They are then cut off


PROGRESSIVE DESIGNS IN WOOD TURNING
PLAIN BOWLS
5"–10" Dia.
TALL BOWLS
6"–11" Dia.
Lay out design on a sheet of paper which is the same size as the desired turning.
LAMPS
10"–15" Tall
NOVELTY BOXES
6"–12" Tall
Cover over one-half of the design while examining the other.
Center may be omitted
8"–14" Dia.
NUT OR FRUIT BOWLS

Patterns of the various wood-turning projects

Close-up of wood turnings made from native trees by boys of the industrial-arts class, Olathe High School, Olathe, Kans. M. H. Ensor, instructor 1918–1954

with the parting tool and set aside until the inside is hollowed out. To do this a hole is first drilled about 1 in. in diameter to the desired depth which may be over 6 in. Then starting in the center with the point of the spear point the inside is roughed out. This does not require much time if the point of the tool is advanced outward from the center of the stock ahead of the cutting edge. The rough area is smoothed with a round nose chisel by advancing it outward from the center at the same time as cutting. Keep the rest close to the stock and work cautiously near the edge for if this is thin vibration may cause the chisel to grab.

The end of a heavy steel bar can be extended over the standard tool rest for a chisel support when getting into deep boxes and bowls. It is necessary, of course, to use a sharp tool in order to get a smooth surface. The box lid is completed by fitting it tightly to the box which acts as a chuck to hold it while finish-turning the outside and forming the knob. Often a separate knob is made and inserted in a hole in the top of the lid.

After the inside is finish-turned and the lid made if required, the outside of the box is completed using the roundnose chisel and spear point for most of the cutting. Moving the tools while cutting makes for a smoother surface.

While turning, curing of the project must be considered. Sap will run out on the chisel while working showing that there is much moisture in the wood. The main point to bear in mind is to so cut or protect the parts that the entire unit will dry out slowly and uniformly, and will shrink in place of checking. A couple days' time will be an advantage in turning if material is kept in a cool place and the extremities doped or shellacked for some of the moisture will get out before sandpapering.

Heavy sanding dries the surface so that shellac will stick for the first coat of finish. Neglect of several days usually means checking which once started is very hard to stop. A better way would be to rough out the project one day and finish it up the next. The second coat of wood finish should be varnish, followed by waxing. This finish should extend over the outer areas of the bottom so as to prevent air from entering before the center of the base has had time to dry out. The pithy center of the tree should be pegged while finish-turning. Beeswax properly colored makes a handy material to fill little defects in the wood and small pithy centers. Upon seasoning if the wood contracts the wax will be forced out and can be easily removed.

Transverse turned pieces made from a crotch of a tree must be free from bark embedded in the fork. The piece must be cut down flat on the two sides and then a circle cut out on the band saw. A faceplate is fastened on in most cases with a heavy center screw and short outside screws. Scraping tools are the only ones used and same precautions apply as for longitudinal turning. It is more difficult to get the grain smooth but sharp tools properly moved will shear the fiber in place of tearing it out of the bowl.

A few satisfactory designs for bowls, boxes, and lamps are shown. These can be varied in size to suit the particular conditions. After turning a few pieces, one possessed with a little creative ability will be able to modify these or make his own designs. It seems to be best to allow the beauty of the wood grain to supply the variety in place of too many unrelated beads and coves. Follow the principle of

dividing your design into two or three main divisions; if two, have the larger at the top or bottom with no guesswork as to which is the major part; if three, the center should be the larger. All long curves should have a snap at the end, while reversing curves should be broken by a square shoulder or bead. Flat trays made from tree cross sections usually are not satisfactory. They warp and check, being unable to shrink up when drying.

The turning lathe will bring out the natural beauty of the wood grain with all of its varied forms, which is far superior to man's feeble creations. It behooves us as instructors to look around us and make the most of what we have in our teaching before being carried away with something which is new and different. We must remember the student learns most with the things he comes in closest contact, and an old wood turning lathe is a mighty good place to start doing and learning.

In the 1954 Industrial Arts Awards on wood turning projects the basic designs of which you can see in the illustration titled "Progressive Designs in Wood Turning": Donald W. Catlin won third place, group B right-hand design of the tall bowl. J. Earl Eblem won third place, group C modified from the left-hand design of the nut or fruit bowl. John Hudelson won honorable mention, group B right-hand design of the plain bowl. James Kean won a place group B on the same design. Sam Hamilton won honorable mention group C on a Colonial knife and fork box turned from the cross section of a log.

## MODERN CANDELABRUM

**HERBERT W. YANKEE**
High School
Stratford, Conn.

The modern candelabrum described and illustrated herewith offers experience to students working in both wood and metals. It is also desirable because of its appeal in view of the recent trend in industrial arts for the making of projects of modern design. The project has especial value when considering all the operations necessary to make it.

The strap iron frame is bent around a 1-in. diameter rod or in a bending jig and then butt welded. The ¼-in. diameter holes for the rods and the 5/32-in. diameter holes for the rivets are then laid out and drilled. Rods, ¼-in. diameter, are next cut to length, inserted into the holes in the frame and then spot welded or pressed in place if preferred. The black iron insert for candle wax drippings is made with a small lip so it can fit inside of the candle socket. This lip can be formed with a plug die on an arbor press or simply by drilling a hole in the center of the insert and serrating the circumference of the hole with small cuts. These cuts will form tabs after bending downward which will fit into the candle socket. The candle socket can be made of maple or of aluminum turned to size.

All the metal parts should be painted with flat black and the maple candle socket left natural with a varnished and waxed finish. This provides a very interesting and modern effect contrasting the light and dark finishes.

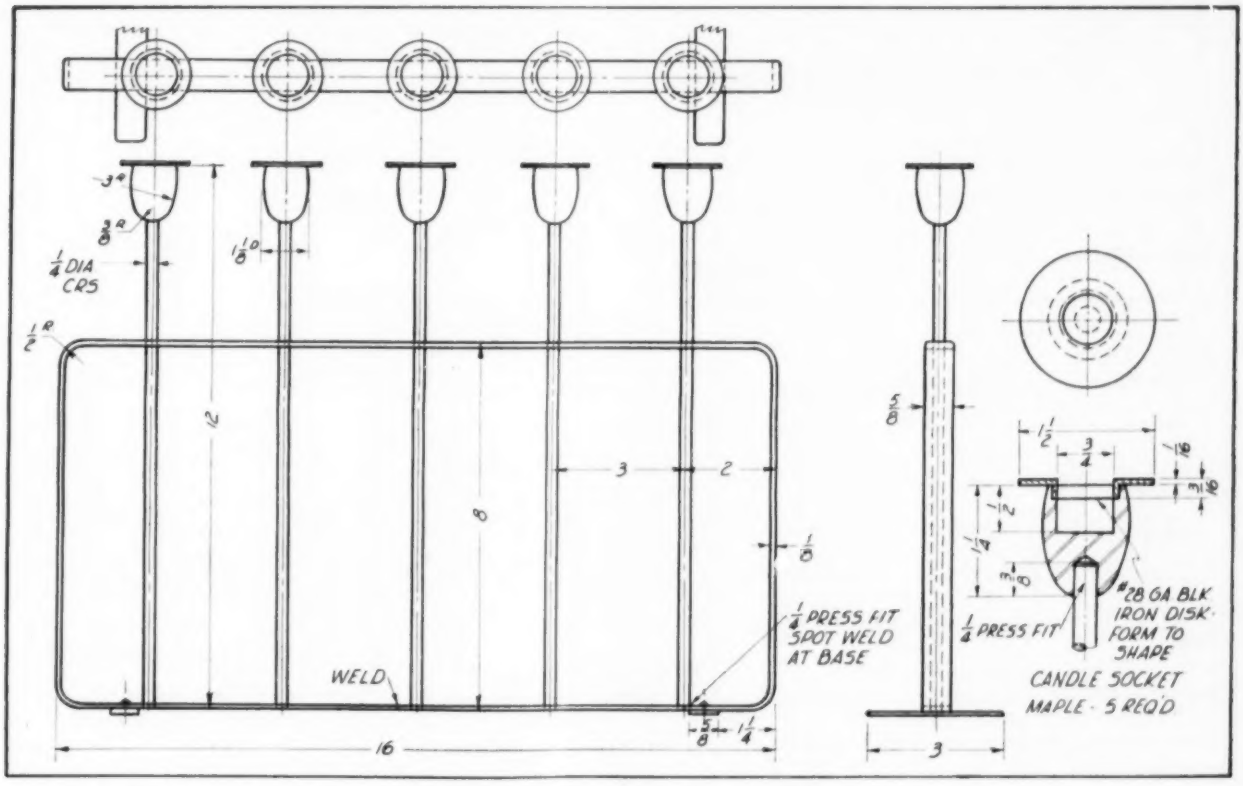
Boys have found this an interesting and satisfying project to make. It is very attractive when used with long white tapered candles.

## CRADLE AS A SHOP PROJECT

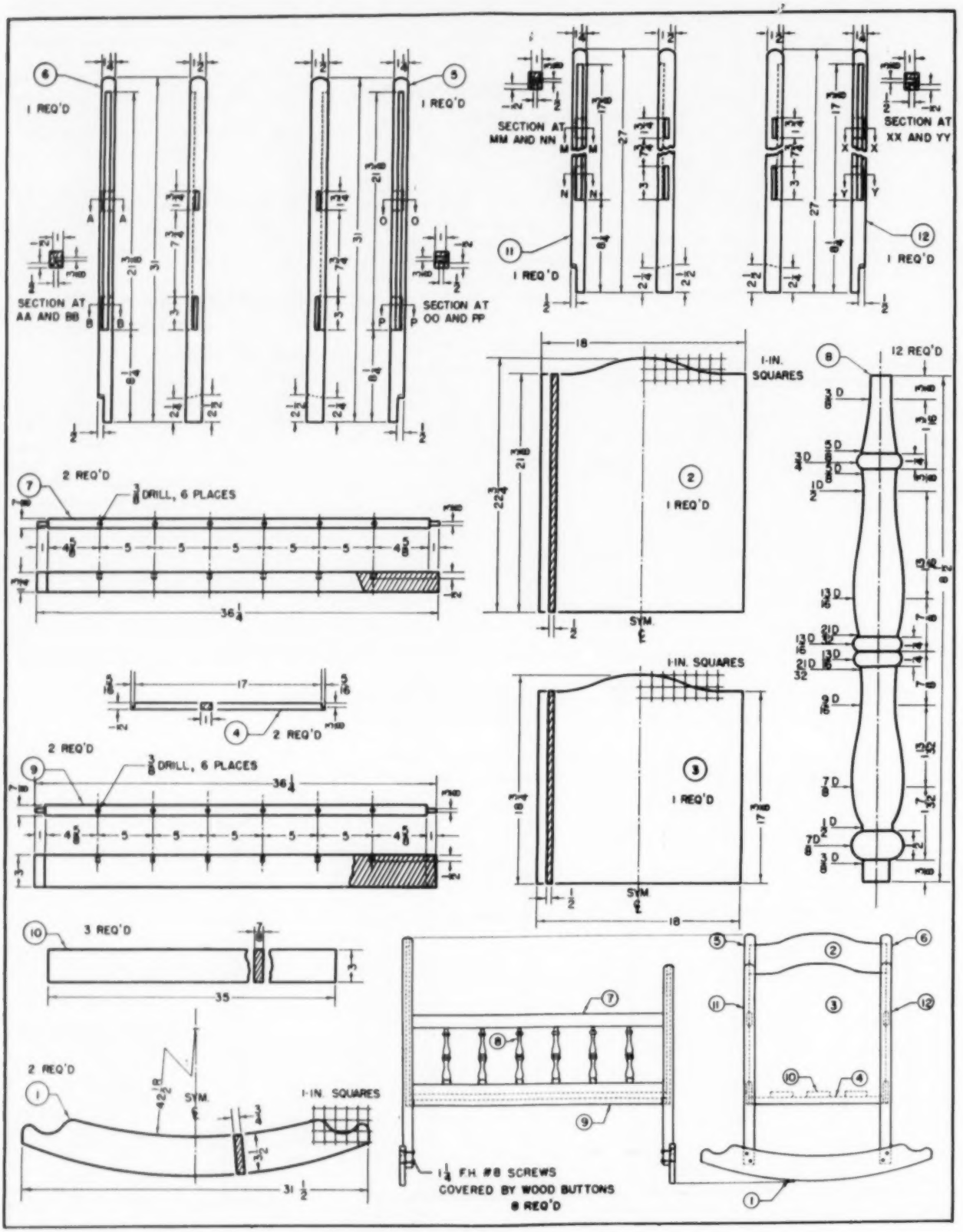
**E. L. SOUTHARD**
Woodwork Instructor
Central High School
Tulsa, Okla.

Cradles may not be as popular with the high school woodwork students as cedar chests, but there are occasional demands for a cradle drawing as there was in the author's shop.

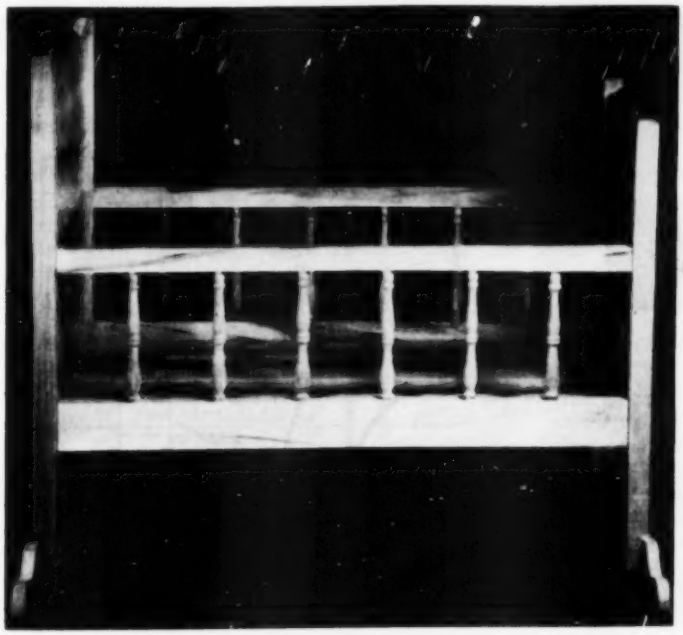
Finding no drawing or blueprints available, a drawing was made from a cradle that was located in this city. It was ancient in date of its origin, but still in fairly good condition and this drawing is an accurate copy of it. Its design is pleas-




Details of the modern candelabrum by Herbert W. Yankee




Details of the cradle by E. L. Southard



Cradle made by Jena Holleman and Ronnie Hildebrant.
Submitted by E. L. Southard

ing even today and from a useful or serviceable standpoint it is very satisfactory.

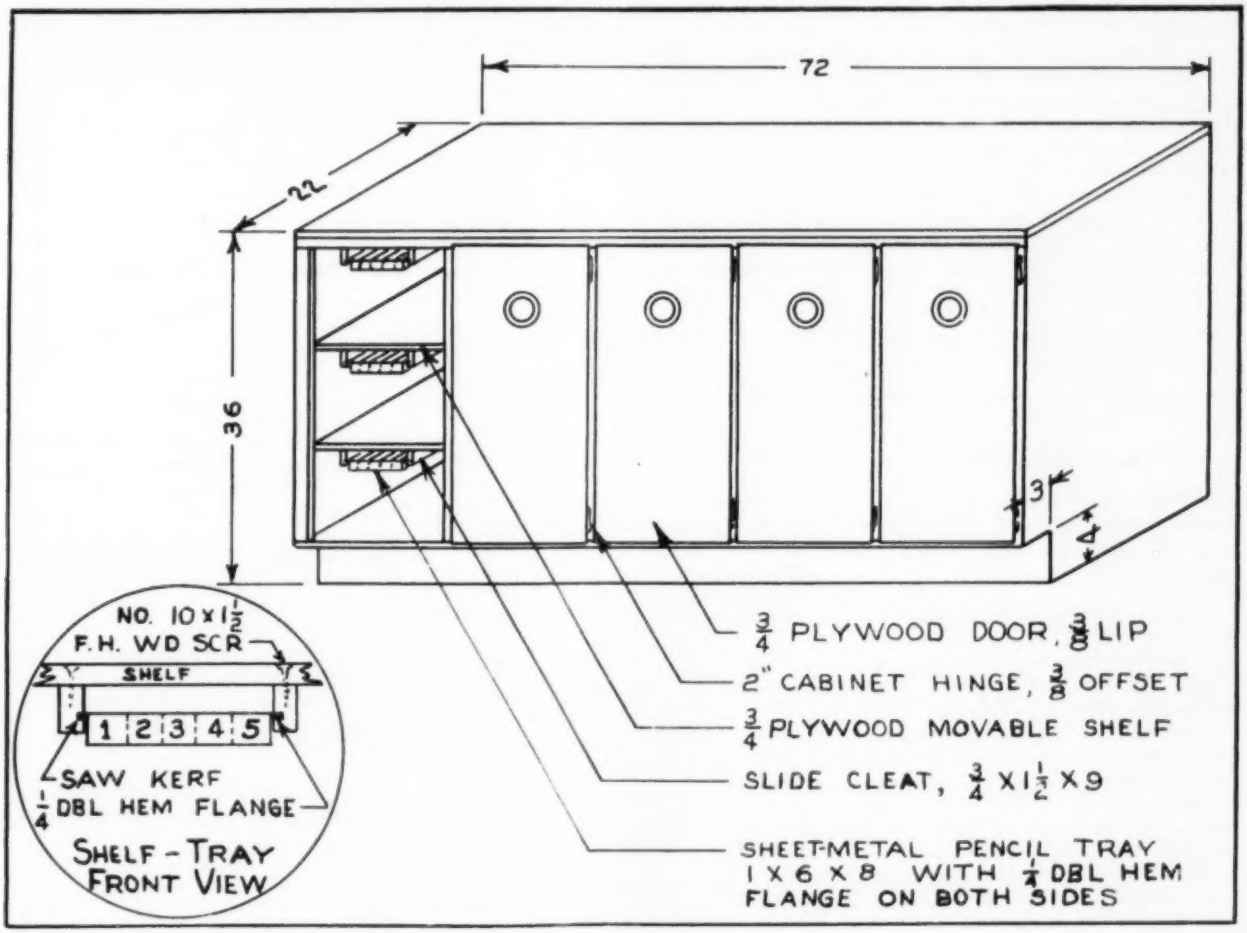
It was made from maple in the author's shop and lacquered natural. It can very well be made of any of several woods, such as walnut, cherry, birch, etc.

## DRAFTING ROOM STORAGE CABINET

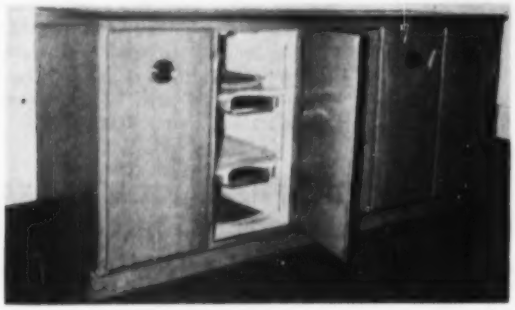
**ROLAND J. KROGSTAD**
and
**CLARENCE SEBRANKE**
Roosevelt Junior High School
Fond du Lac, Wis.

What to do with drafting students' drawings, pencils, erasers, etc. when the students are attending other classes is not an uncommon problem. If allowed to take them from the room, students frequently lose them or forget to bring them to class.

A convenient, orderly, and efficient method of daily collection, storage, and distribution of the afore-mentioned items is greatly facilitated by using the storage cabinet shown in the accompanying illustrations. This cabinet was built for a situ-




Drafting room storage cabinet



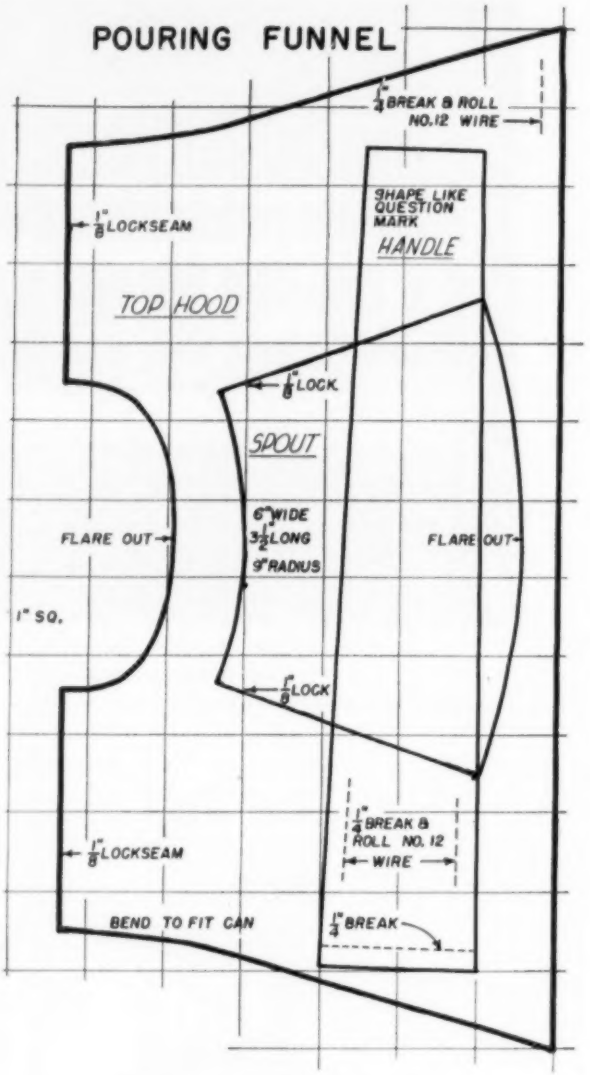
Storage cabinet for drafting room

ation in which individual students do not use complete drawing sets, but merely their own pencils and erasers, and classroom instruments on a "cafeteria" basis, and where the students do not have individual storage compartments at the drafting table.

The cabinet is divided into five major compartments with one compartment used for each class or class period of the day. Each compartment has a separate door which could be numbered to correspond to the class period of the day. Each compartment has three movable shelves and three small metal pencil trays (one shelf and tray for each row of tables in the room). Another shelf and tray could be very easily added if the room should ever be rearranged or another row of tables added. The shelves are large enough to accommodate 12 by 18-in. drawings. Each pencil tray has five numbered compartments, one for each table or student in the row.

The cabinet is used as follows. Each student keeps his drawings in a large manila folder. At the end of each class period the student at the rear table in each row collects the folders in his row, placing them on top as he moves to the front of the room. The collectors place their folders on their respective shelves in the cabinet (row one on the top shelf, row two on the second, etc.). The folders remain there until the next class meeting when the same students remove the folders from the shelves and distribute them, removing them from the top as they pass back to their rear tables. The pencils and erasers are collected and distributed in much the same manner by another student in each row by removing the tray from the shelf.

Undoubtedly, many changes and improvements could be made to this system to adapt it to various situations.




Details of the pouring funnel

## POURING FUNNEL

**MARSHALL H. ENSOR**
Industrial Arts Teacher
High School
Olathe, Kans.

This is a useful article for anyone owning a car, tractor, or just a "pop-pop" lawn mower. If the body is made from a No. 10 fruit can with 6 rings, each ring will measure about a pint. A plain No. 10 can will make both the spout and funnel, but a piece of another can will be needed for the handle.

The illustration shows the parts overlapping. If these are cut from tin can strips for patterns, repeated use can be made of them for making this project. The handle can be laid out easily with a rule, likewise the spout with a rule and divider and thereby made more or less pointed.

Form ⅛-in. lock seams but break about ¼ in. and roll No. 12 wire on the outside of the funnel with a hammer before locking the seam together. Break ¼ in. and roll wires on the outside of the handle. Form the handle in the shape of a question mark with a ¼-in. break at the top to hook inside of the can. Lock seam the spout and solder on the outside of the funnel. Solder the funnel near the seam on the inside of the can first by allowing ⅛ in. of the funnel to extend inside. By putting the parts over a stick, an experienced tinner can work around to the edges of the funnel doing a smooth job but a helper will be needed for the inexperienced. The handle is soldered on last.

Pouring funnel

The yield of gasoline from crude oil has almost doubled since 1918. —*Petroleum Newsnotes.*

* * *

The American Optometric Association says that improved lighting in school rooms could save millions of children from eyesight problems.

## PROJECT DESIGN FOR TEACHERS

**ALEXANDER F. BICK**
**Milwaukee, Wis.**

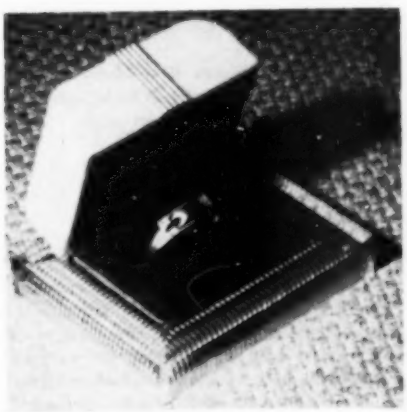
*(Continued from page 172 of the May, 1954, issue)*

The ideals of today are seen in the trends of today. Trends in design are generated in the high bracket design professions which cater to a mature clientele. Design in the ultimate must aim at raising the tone of the community, and redesign its environment.

This advanced concept of design may be taught in the school shop by simply offering students the clean and direct association with excellence in contemporary design.

Every shop teacher may be an authority in design by his own effort, and it is not difficult nor is it a chore to attain this desirable status. The process toward such attainment is given in the article in the June, 1953, issue, page 188.

It is one of the intentions of this series to show the simplicity of commodity design. As in previous articles, the system is given as a twofold one, and if studied, it will be seen to consist of, first, engineering of a kind, and second, of applying a symbol. In the accompanying plates, this system is shown, step by step, as the final designs are developed. Each article singles out a typical commodity, this one being confined to the design of wall shelves in wood.

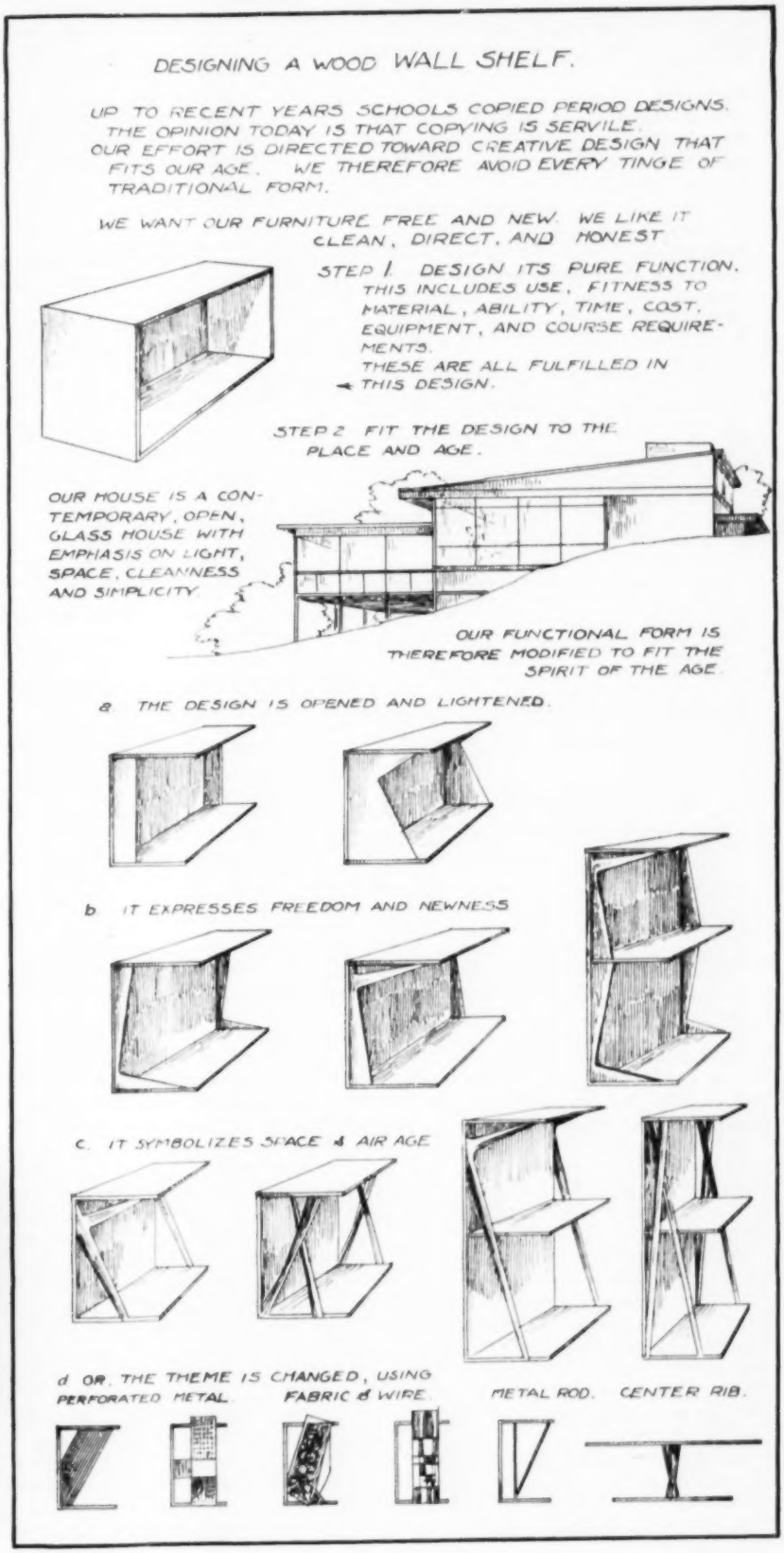


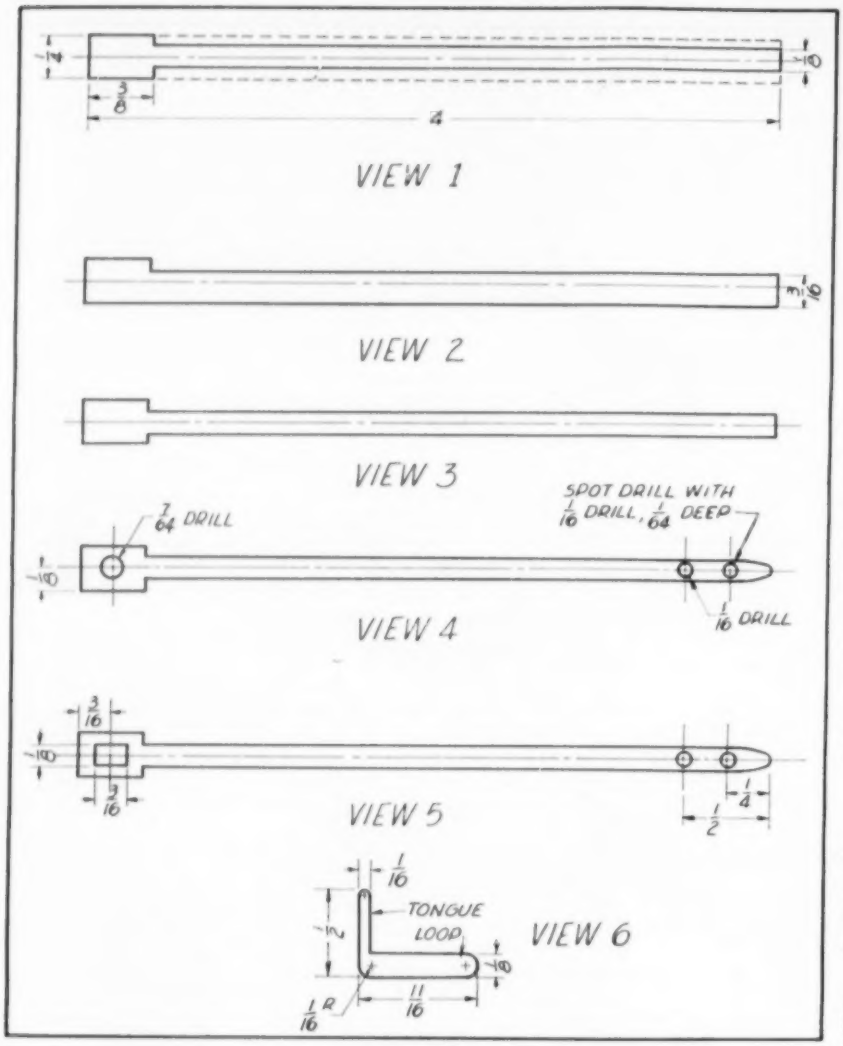
The finished belt ring

## A BELT RING

**WAYNE COLLINS**
**Central High School**
**Hobart, Ind.**

Many of our readers have seen or made the old horseshoe-nail ring. Here is a project that I think will catch the student's eye as much as the horseshoe-nail ring did ours. The ring is fairly simple to make; yet it requires the fundamental practices


DESIGNING A WOOD WALL SHELF.
UP TO RECENT YEARS SCHOOLS COPIED PERIOD DESIGNS. THE OPINION TODAY IS THAT COPYING IS SERVILE. OUR EFFORT IS DIRECTED TOWARD CREATIVE DESIGN THAT FITS OUR AGE. WE THEREFORE AVOID EVERY TINGE OF TRADITIONAL FORM.
WE WANT OUR FURNITURE FREE AND NEW. WE LIKE IT CLEAN, DIRECT, AND HONEST.
STEP 1. DESIGN ITS PURE FUNCTION. THIS INCLUDES USE, FITNESS TO MATERIAL, ABILITY, TIME, COST, EQUIPMENT, AND COURSE REQUIREMENTS. THESE ARE ALL FULFILLED IN THIS DESIGN.
STEP 2 FIT THE DESIGN TO THE PLACE AND AGE.
OUR HOUSE IS A CONTEMPORARY, OPEN, GLASS HOUSE WITH EMPHASIS ON LIGHT, SPACE, CLEANNESS AND SIMPLICITY.
OUR FUNCTIONAL FORM IS THEREFORE MODIFIED TO FIT THE SPIRIT OF THE AGE.
a THE DESIGN IS OPENED AND LIGHTENED.
b IT EXPRESSES FREEDOM AND NEWNESS
c. IT SYMBOLIZES SPACE & AIR AGE
d OR THE THEME IS CHANGED, USING
PERFORATED METAL
FABRIC & WIRE
METAL ROD
CENTER RIB




**Details of the belt ring**

in bench work. All that is needed for material is a piece of 17 to 25-gauge stainless steel or aluminum. The following steps are suggested for completing the ring:

1. Secure a piece of the proper sheet metal and cut to a length of 4 in. and a width of ¼ in. Naturally these dimensions may be changed to meet the size of the student's finger.

2. Blue or chalk your piece of metal and lay out to dimension as shown in View 1.

3. Place metal between wood or soft metal and fasten tightly in vise. Using a 32-pitch hack-saw blade, saw the 1/16-in. kerf parallel ⅜ in. from the buckle end. Starting from the opposite end, saw along your layout line 3⅝ in., or until you meet your kerf (View 2).

4. Turn your piece around in the vise, keeping the layout side toward you, and repeat step 3. If you have followed your lines, you now have a piece looking something like View 3.

5. Secure a sharp single cut file and smooth your sawed edges. Be sure to keep your work protected from the hardened vise jaws by holding work between wood or soft metal.

6. Counterpunch and drill a 7/64-in. hole in the center of the ⅜ by ¼-in. end. This will eventually be your buckle hole. While you are still at the drill press, center-punch and drill a 1/16-in. hole ½ in. from the tail end of the ring. Also, spot drill 1/64 in. deep with 1/16 in. drill, ¼ in. from the tail end. This spot drill will give the impression of another hole. Remember, while drilling, to protect your ring surface from being scratched (View 4).

7. Using a small rattail and triangular file, file the buckle hole until you have a ⅛ by 3/16-in. rectangle. Also round off the tail of your ring to suit the individual taste (View 5).

8. Secure another piece of the same thickness of metal and duplicate View 6 by sawing and filing. Round all edges. This will be your loop and tongue which fits through the hole in the tail, coming to rest on the front of the buckle.

9. Polish both pieces to a high brilliancy, using very fine emery cloth.

10. Now form the tail of your belt in a circle and place up through the buckle hole. Make sure the 1/16-in. hole is visible within the buckle hole. (The ring may be formed over your finger or wooden dowel rod.)

11. Stick tongue about ⅛ in. through the 1/16-in. hole of belt's tail. Bend remainder of tongue parallel to the top of ring away from buckle.

12. Bend loop around top of ring and over the tail. Make sure end of loop fits snugly on underside of ring and that the spot drill is clearly visible. On bending the tongue and loop, you may have to use pliers. Be careful not to nick the ring.

13. Remove all sharp burrs and buff to high gloss.

The smaller the thickness of metal used, the easier it is to form the pieces. The student may find different designs he would like to use such as inlaid plastic around the ring or a different type of belt tail.

*The drafting was done by Hobart High School drafting class and the photograph was made by Hobart High School photography class.*

## A SIMPLE SCOREBOARD

**STAN SCHIRMACHER**
**Industrial Arts Department**
**High School**
**Cottonwood, Ariz.**

Here is an economical scoreboard which is neat in appearance and is readable at longer distances than more expensive factory-made models. And, to add to its economy, it is operated by boy power.

The most expensive item in the bill of materials could be the sheet metal, but this simple scoreboard utilizes the tin plate from large one-gallon No. 610 tin cans. This tin plate is used for the 44 6¾ by 9-in. plates, which are corner cut at about ¾ in., and also for the name cards, 6¾ by 18 in., which could be of cardboard in an emergency.

The number plates have 5 by 7½-in. numbers made as shown. The lettering on the name cards is painted with 1¼-in. strokes.

The *hinges* for the number plates are bent from ⅛-in. steel wire with 1⅛-in. *U rings* which stand out about 1½ in. from the back and are fastened in place with simple staples.

The name cards are held in place with two 4-in. holders on the sides and one 10-in. holder on the bottoms. These are made of heavier sheet metal about 1½ in. wide with ½ in. bent back as the *slide* or *holder*. Each of these are drilled and countersunk for two flathead wood screws.

Simple scoreboard

**BILL OF MATERIAL**

| *No. of Pieces* | *Name of Part* | *Material* | *Size* |
|---|---|---|---|
| 1 | Back | Plywood or Masonite | 24 x 75 in. |
| 2 | End trim | (lengths) | 24 x 1 x 2 in. |
| 2 | Long trim | (lengths) | 72 x 1 x 2 in. |
| 44 | Number plates | Sheet metal | 6½ x 9 in. |
| | Card holders | Sheet metal | 6¾ x 18 in. |
| 4 | Card holders | Sheet metal | 1½ x 4 in. |
| 2 | Card holders | Sheet metal | 1½ x 10 in. |
| 12 | Flathead wood screws—¾ in. | | |
| 40 | Small galvanized staples | | |
| | Hinges — ⅛-in. steel wire | | |
| | Nails for trim | | |
| | Paint | | |

The name cards employ abbreviations as shown, which were set up simply to show the number positions. The *SEDO* is for Sedona in nearby famous Oak Creek Canyon, and *CLEM* is for Clemenceau, a suburb of Cottonwood, named after Georges Clemenceau of France.

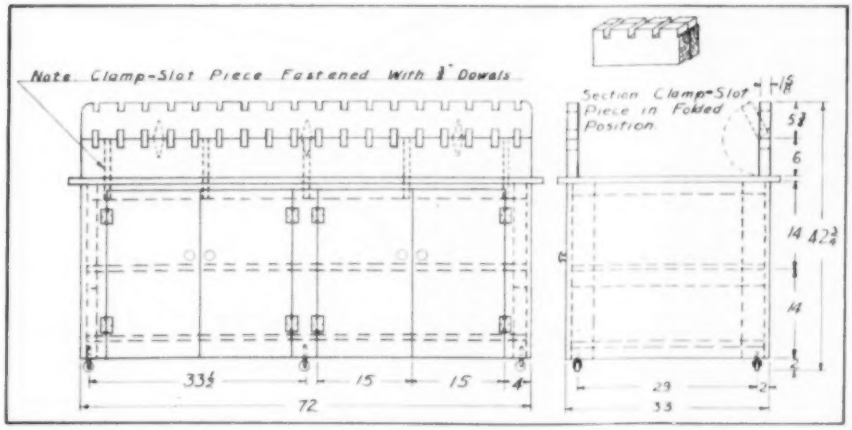
The scoreboard is painted in school colors, if contrast enough.

## PORTABLE GLUE TABLE

**GEORGE V. RADCLIFFE**
Industrial Arts Education
University of Idaho
Moscow, Idaho

A practical, yet neat-appearing glue table is a necessity in the woodworking shop. The table described here is a combination of ideas obtained from visiting such shops in various schools, together with some features that have been added. With this table it is possible for a student to have at his immediate disposal clamps and glue or gluepot. Yet, when the gluing up process is completed, he is able to move his work or project to the storage room or drying area with little or no assistance from classmates. This table has been used in two different teacher-training institutions and has proved quite satisfactory.

In many of the departments visited it seemed to be a foregone conclusion for the top to be covered with sheet metal to be able to clean off old glue. We have found that by treating the top with numerous applications of hot linseed oil and turpentine the glue — fresh or dry — does not adhere so easily and can be cleaned off quickly with a hand scraper. The wooden top makes a much nicer appearing table than one that is covered with metal. If it is cleaned at the close of each quarter or semester, it proves to be an inspiration to the new incoming class.




Details of the portable glue table

Since the size of the shop will materially affect the size of the table, no bill of material is being provided. The sides, ends, top, and bottom can be covered with shiplap. However, the material used would not have to be tongued and grooved. The casters should be fairly sturdy and of ball-bearing type to assure free and smooth movement. Painting the sides of the table is optional.

Hinging of the second 2 by 6 in. to the stationary one is optional. However, the students find it to be of great advantage when gluing up projects. By using the second one, it provides ample space between the table top and the bottom of the project for ease in use of clamps. Work, therefore, can be completely clamped up before being moved to storage space. This does not mean that the projects need not be checked for squareness after being moved, but it does mean little or no time used in making adjustments in most cases.

If the shelf is built only halfway across the table it is possible to use the other half for the storage of larger containers. A rack placed on the one door also makes a convenient place for storing of old newspapers.

A slight push will swing the table in any direction and will quickly win the favor of school custodians, since it helps to make his work much easier.

## LET'S DRESS UP OUR BULLETIN BOARDS

**JAMES T. CAMPANELLA**
Buffalo, N. Y.

Bulletin boards in our industrial-arts shops serve many purposes, but too often they become dull attachments on the wall. In order to keep them alive and interesting they should be dressed for the many varied occasions in a school year.

Pre-planning the bulletin board for the year aids in the collection of items, and cuts down on the *chore* of pinning one up. Through the use of a monthly file system, ideas and clippings can be catalogued until they are needed. It is advisable when planning the board to incorporate ideas into special seasons of the year, holidays, events, etc. In so doing, the board becomes interesting and eye catching, and is related to events familiar to the students.

A sample schedule would be as follows:

September —
- Pictures of projects to be made
- Safety charts

October —
- Pictures of tools (autumn leaves background)
- Cartoons depicting shop errors or boners (Halloween background)

November —
- Short-period projects
- Projects of colonial origin (Thanksgiving)

December —
- Projects for Christmas gifts
- Christmas decorations with greetings from instructor

January —
- Safety posters
- Tool identification picture contest

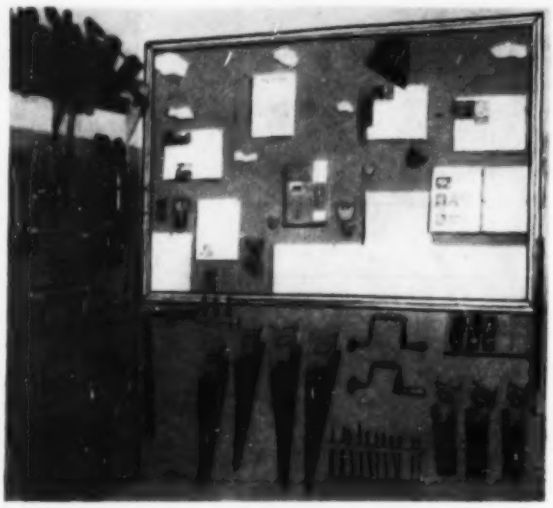
February —
- Correct tool usage ideas
- Period furniture projects (Washington and Lincoln)

March —
- Birdhouses (kites and March wind)
- Garden furniture and ornaments (flower cutouts)

April —
- IAA contest information
- Projects for mother (Mother's Day)

May —
- Garden tool care hints and screen repair
- Painting hints for outdoor furniture

June —
- Close of school cleanup schedule (Flag Day)



Dressing up the bulletin board

The bulletin board in the accompanying photograph was one set up for March of this year. Although they cannot be clearly seen, the project ideas revolve around birdhouses and garden furniture. Through the use of cutouts depicting the coming of spring the board attracted attention and added much needed color to the general surroundings.

In pinning up any bulletin board it is advisable to follow rules of good display, balance, eye-catching colors, etc. It has been found that changing a board at frequent intervals (every two weeks) helps to draw attention to it and causes a certain amount of expectation. Little trick gadgets used with displays will draw attention to them and will bring about a more thorough investigation of each one. An example of this was the use of colored string criss-crossing the board in no special pattern. Pupils were attracted by the string and while investigating its reason for being there, they became interested in the material on the board.

By setting up eye-catching and interesting shop bulletin boards our students will, on their own accord, investigate the material on hand and look forward to future displays.

## LETTER AND BILL REMINDER

**ALBERT E. FENN**
Taft High School
Chicago, Ill.

This attractive, small plastic project is suitable for junior and senior high school students or home workshops.

The letter and bill reminder is both useful in the office and at home. It can be placed on a desk, in a niche, or on a mantel, thus adding beauty to the home.

Approximately 10 letters or bills may be inserted between the holder parts.

Students will learn something about the characteristics of plastics by working on it with the saw, file, drill, sandpaper, cement, and buffing wheel.

The procedure for making this inexpensive project is as follows:

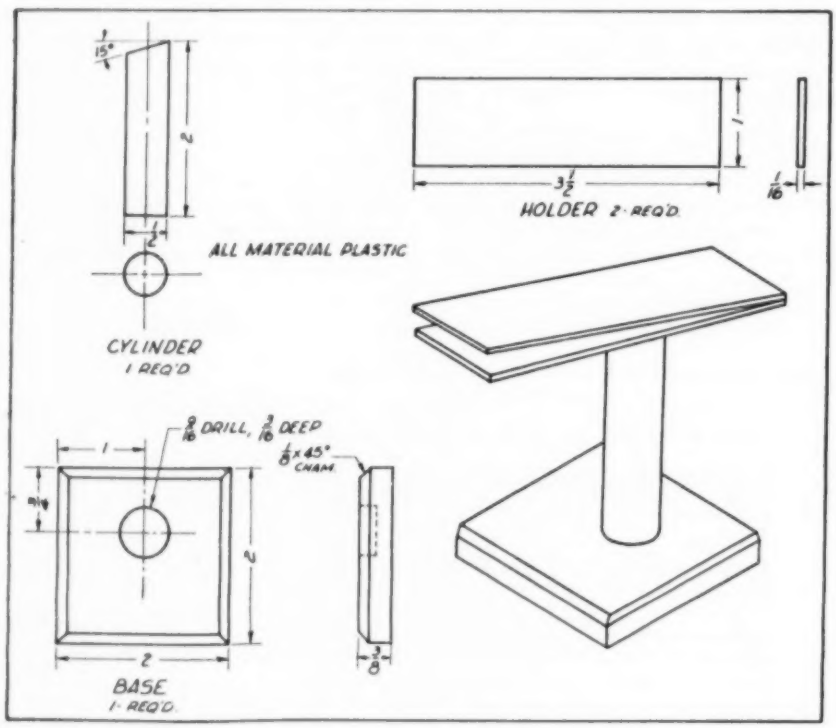
1. Select an opaque plastic and cut base to ⅜ by 2 by 2 in. The opaque plastic hides the cement joints.
2. Drill ⅜-in. hole in base.
3. File sides and make a ⅛-in. — 45-deg. bevel on all edges.
4. Sand bevel and sides.
5. Cut cylinder stock to ½ by 2 in.
6. File 15-deg. angle on one end of cylinder.
7. Sand rough sides of cylinder.
8. Cut two holder pieces 1/16 by 1 by 3½ in.
9. Sand both pieces.
10. Polish all parts on buffing wheel. There shouldn't be any marks or scratches on the parts.
11. Place DuPont Duco cement in base hole and on bottom end of cylinder.
12. Insert cylinder into base hole and let dry.
13. Hold ⅛-in. dowel rod between two holder parts, adjust rod to make 15-deg. angle and cement one end only.
14. After drying, cement holder to cylinder.

Red, blue, white, or black plastic may be used to make this colorful project. Black would be appropriate with wrought-iron furniture.

White, a neutral color, would blend in with any type of furniture.

The students making the letter and bill reminder would acquire new skills by working with plastics.

The simplicity of this project would serve as an incentive to make more plastic items.




Letter and bill reminder

## TIME-WORK SHEET

**LARRY COWLES**
Berea, Ohio

In large shop classes, with a great variety of projects going at one time, the instructor needs a means of checking the boy's progress as well as identifying his project. This may be accomplished by using a time-work sheet, which is a combination work sheet and time card.

The work sheet has space provided for a complete list of materials and places where they have been purchased. The boy must list the materials required and determine the total cost. This also aids the instructor in billing the boy for materials purchased from the school. Space is provided on the back of the time-work sheet for a scale drawing of the project. The drawing may also serve as a means of integrating drawing with other areas in the shop. After the boy completes the list of materials and the scaled drawing he should have the working procedure well in mind and be ready to start work on his project.

The time card portion of the sheet keeps a running record of the hours spent on each project. The time card is used to ascertain the boy's progress in relationship to the work hours and to give the instructor a fair idea of how well the boy uses his time and organizes his work. A weekly check of the time-work sheet is necessary to keep in step with the boy's progress and to catch any possible errors.

The time-work sheet may be mimeographed or printed on any heavy paper stock. It has been found that this method puts a little pressure on the boys and this additional push produces more work and a better quality project. Upon completion of the project the time-work sheet becomes a part of a permanent file set up for each boy.

## LETTERING VISUAL AID

**ROLAND J. KROGSTAD**
Roosevelt Junior High School
Fond du Lac, Wis.

Lettering can make or break a drawing. Although lettering is a phase of drafting in which it is difficult to maintain student interest, few will dispute the fact that some time should be spent on the teaching of lettering.

The letter cards shown in Figure 1 facilitate the convenient, yet effective, teaching of lettering. Each card contains three letters drawn with India ink on a 6-in. square grid. Arrows designating the strokes are drawn along the side of each letter. Two holes punched on the top facilitate the easy hanging and removal of the cards from the wall above the chalk board. They have been given two coats of shellac.

Fig. 1. Lettering aid

The visual aid is used in the following manner. One card of three letters is taught each day at the beginning of each eighth-grade class near the beginning of the course. The card is held up before the students; the first letter is explained as to proportion, stability, strokes, and spacing; the teacher reproduces the letter on the chalk board as the students make their letters on one-eighth inch square graph paper. The same procedure is repeated for each of the other letters. To allow space for more letters, and because it is not difficult to transfer the proportion of a letter from a six square grid to three squares, the students make their letters three squares high.

The visual aid has the following advantages: (1) It is convenient to use and provides a correct letter for the teacher who may have difficulty in making a good letter on the chalk board. (2) It provides a means of quickly settling a class down to work at the beginning of a class period. (3) It facilitates the spreading of the teaching of lettering over a period of time. (4) The cards hanging on the wall provide a ready reference for students.

### TIME-WORK SHEET

Name

Name....., Project.....

Grade ....., Section.....

| Materials: | | Quantity |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Where Purchased: Cost:

### Time Sheet:

| Date: | Mon. | Tues. | Wed. | Thurs. | Fri. | Overtime | Total | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Total Hrs. Grade

Make drawing on the back.

## SHEET-METAL TEACHING TECHNIQUE

**RAY C. DOANE**
and
**SELVIN ZABEL**
Industrial Arts Department
St. Paul Public Schools
St. Paul, Minn.

The form shown herewith is a student guide sheet for learning some basic operations in sheet metal. It was proved successful in many industrial-arts shops of the St. Paul public schools. This form was duplicated and distributed to each student taking beginning sheet metal.

Teaching techniques of fundamental sheet metal operations vary considerably among teachers of industrial arts. Each technique should establish a high degree of efficiency during the teaching-learning process.

The suggested technique implied by the use of the form has many unique features. It suggests a sequence of demonstrations by the teacher. It enables students to learn many fundamental operations in a relatively short period of time. There are progress checking points throughout the form. After the completion of the learning activity, high ability students may progress faster on individual projects because they need not wait for the instructor to give a demonstration of needed operations. Conversely, the instructor may give more attention to lower ability students.

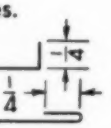
Student reaction about the use of this form has been encouraging and enlightening. Students of the junior high level have the feeling of "really learning something about sheet metal." They appreciated having the learning activity outlined to know what is expected of them from beginning to end.

### INDUSTRIAL ARTS DEPARTMENT
**ST. PAUL PUBLIC SCHOOLS**

Name.....
Grade.....
Period.....

Note: This is your GUIDE SHEET. Dot not lose it.

1. Layout and cut a piece of sheet metal 3 inches by 8 inches.
2. Make a right angle bend at one end.
3. Fold the other end to make a single hem.



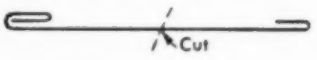

Note: Your piece should look like this:

Instructor's Initials

4. Fold the end with the right angle to make a double hem.

Note: Your piece should look like this:

5. Cut this piece of sheet metal in half.




6. Fold each piece to make a grooved seam.

Assembly steps: 1.

2.

3.

Instructor's Initials

7. Cut between double hem and seam.

8. Solder ¼-inch lap joint.

Instructor's Initials

9. Cut between seam and single hem.

10. Place two sheet metal rivets in ½-inch lap joint.

Instructor's Initials

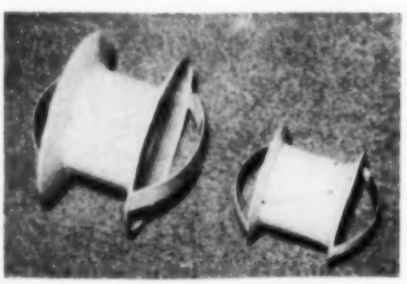
## TIN-CAN KITE-STRING REELS

**J. W. BOLLINGER**
Tulsa, Okla.

Rather than wind a kite string on a stick, any active boy would prefer to have a kite-string reel like the ones illustrated herewith.

They are easy to make, too.

To make the ends, cut the bottoms off two large size cans with a can opener. Raise them bowl shaped with a mallet over the end of a large diameter piece of pipe.



Tin-can kite-string reels

Cut a can of smaller diameter the desired length, and solder it in place between the two end pieces.

Fold the tin for the handles over several times on the bar folder for adequate strength. Roll a slight curve into them on the slip roll former, and solder them in place.

Smooth with fine emery cloth. Apply two coats of enamel or lacquer.

The smaller reel shown may be used as a homemade fishing line reel!

ATF Good School News
GRAPHIC ARTS—THE EDUCATIONAL FIELD WITH A FUTURE
American Type Founders, Educational Services Department, 200 Elmora Avenue, Elizabeth, New Jersey

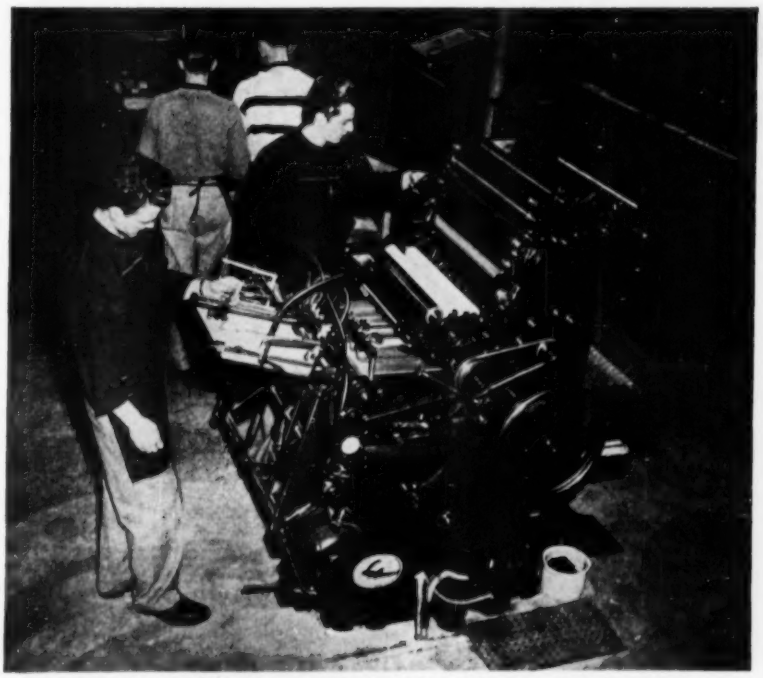
# Vancouver Has Complete Graphic Arts Program

A complete graphic arts course is now being offered in Vancouver, Wash., by Clark Junior College, Vancouver and Washington high schools—all operated by School District 37.

More than a thousand students, ranging from 10th grade high school sophomores to trade extension and trade training men are given thorough practical training in both letterpress and offset printing.

The well-equipped shop occupies two floors of Clark College's new million dollar building for vocational and applied arts. The new 17 x 22 ATF Chief, shown to the right, was selected for training students in the offset process. A 14" ATF darkroom camera and a No. 4 Little Giant are also in operation. Other ATF distributed equipment includes a Challenge drill, Diamond paper cutter and a Morrison saw and router unit.

The aims of the graphic arts division, according to Dean Oliver B. Klossner, are "... to give the students a complete view of graphic arts theory through job work, classroom instruction, movies, plant visits and lectures...".



*ATF 17x22 Chief at Clark College Graphic Arts Division trains students in offset printing.*

*ATF 14" darkroom camera gives Vancouver printing students actual experience in making plates for offset work.*

### GRAPHIC ARTS SHOP PLANS

New Junior and Senior High Industrial Arts and Vocational Shop plans and specification folders have just been completed. These include two suggested General Shop layouts and three Unit Shops to accommodate from six to ten, fifteen to twenty, and twenty to twenty-four students. The two Vocational plans are designed for ten to twenty and twenty to thirty students. Write us for the layout which will best fit your school's needs.

## Alabama School of Trades at Gadsden installs new ATF Little Giant Press

The popularity of ATF Little Giant presses for graphic arts instruction is rapidly increasing. With the installation at Gadsden they are now being used in schools of thirty four states.

Because it operates on the same principle as the Kelly and other larger presses, the Little Giant is a particularly valuable training tool. It not only introduces students to the whole field of letterpress printing, but the Little Giant itself is finding ever increasing use in the graphic arts industry. Its centralized controls facilitate both operation and instruction. Also, being completely guarded and easily braked for immediate stops, the Little Giant 6 is easily the safest press on the market today. A Micro-Safety switch prevents operation when the press' side guard panels are removed.

*This ATF Little Giant is now being used in the graphic arts vocational course of the Alabama School of Trades at Gadsden, Alabama. An ATF Big Chief offset press is also in use here.*

## GLYCERINE

(Continued from page 9A)

290° C.) and low vapor tension are an assurance that it will stay put even when the thermometer rises to tropical heights. On the other end of the scale is the ability of glycerine solutions to resist freezing. This familiar property has long been employed in the production of antifreeze solutions for automotive equipment and deicing fluids for aircraft. More recently this property has found important utility in the preparation of chilling media for the quick freezing of foods by the immersion process.

One of the most outstanding physical attributes of glycerine is its strong affinity for water. This hygroscopic or humectant action is very extensively employed where excessive moisture loss is to be avoided as in cosmetics, foodstuffs, adhesives, packings, gaskets, crown cork compositions, and numerous other products. This hygroscopic action is intimately associated with the outstanding efficacy of glycerine as a plasticizing agent. Indeed, glycerine may be classed as one of the most important plasticizers of industry; being employed where flexibility and softness must be maintained.

Glycerine is also an important chemical substance. As was pointed out by leading authorities on this material, the chemical properties of glycerine are unique. As a trihydric alcohol with the chemical formula $C_3H_5(OH)_3$, it is possible for either one, two, or all three of the hydroxyl (OH) groups to react with a given reagent. It is also possible for each one of the three groups to react with a different substance to produce compounds of a mixed type. It is evident that a remarkably large number of glycerine derivatives are possible.

Among the most important of these derivatives are the glycerine esters, and the most valued esters include the alkyd resins, ester gums, nitroglycerine, acetins, and certain long chain fatty acid derivatives. In recent years, various monoglycerides, like glyceryl monostearate, have attracted much interest as homogenizers or emulsifiers for foods, fats, and for various industrial products.

Despite the fact that glycerine can be made to react chemically to form numerous widely diversified compounds, it is a highly stable compound under normal conditions. Hence it can be used for the sake of its physical properties without fear of chemical complications.

Glycerine was discovered in 1779 by the great Swedish scientist, Karl Wilhelm Scheele. Although its properties were studied subsequently by some of the world's most eminent chemists, glycerine remained a chemical curiosity until about the middle of the nineteenth century. It was in France that it received the initial impetus that led to a wider and greater appreciation of its industrial potentialities.

French textile manufacturers had been seeking ways to overcome the health hazards of the high temperature and humidity required in the mills to prevent the breaking of delicate threads during weaving. In 1862, they found that, because of its hygroscopic action, direct treatment of the threads with glycerine prevented the threads from drying out, thereby obviating the need for keeping the air in an unhealthy humid condition. Proved successful at Tarare in the manufacture of muslins, the use of glycerine spread to other textile centers in France and from there to other countries.

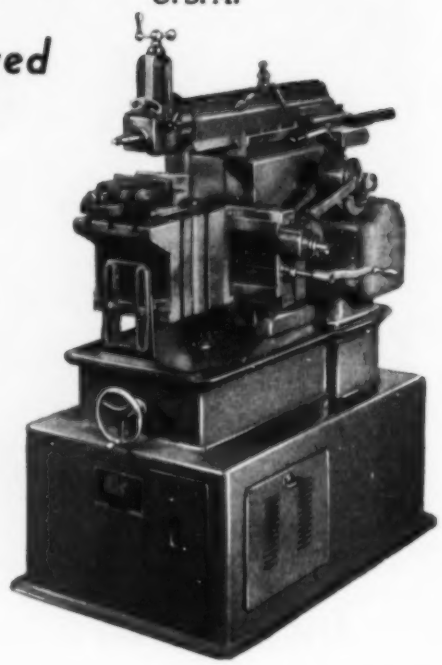
In England, Perkin's work with the synthetic coal tar dyes led to the use of glycerine in textile printing pastes. This remains one of the principal uses of glycerine in the textile industry. In addition it has found important applications in dye baths, in textile lubricants, in sizing compositions, in various kinds of finishes and in many more specialized treatments. The employment of alkyd resins, made with glycerine, has led to the development of improved textile finishes.

The properties of glycerine have been adapted by technologists to the solution of many problems in the paper industry and to improvements in paper products. Its plasticizing action, nontoxicity, grease re-

(Continued on page 24A)


SHELDON
CHICAGO U. S. A.

12" Back-Geared SHAPER



*Are your graduates actually ready for industry?*

With this 12" back-geared industrial shaper, your students can do full-sized, close tolerance shaper work. Can overcome a novice's natural fear of large, full-powered machine tools — can become competent, confident operators who know what a real shaper can do.

Priced within the range of school shops, this man-size 2000-lb. quality shaper is industrial in design, capacity, power, controls, features, and "big tool feel." It is a safer shaper for school shops because all changes and adjustments can be made from one operating position — no reaching over. It's safer because all gears, belts, and moving parts, other than the ram itself, are fully enclosed and all speed changes are made with an external hand wheel. It is becoming the standard shaper in the better school shops.

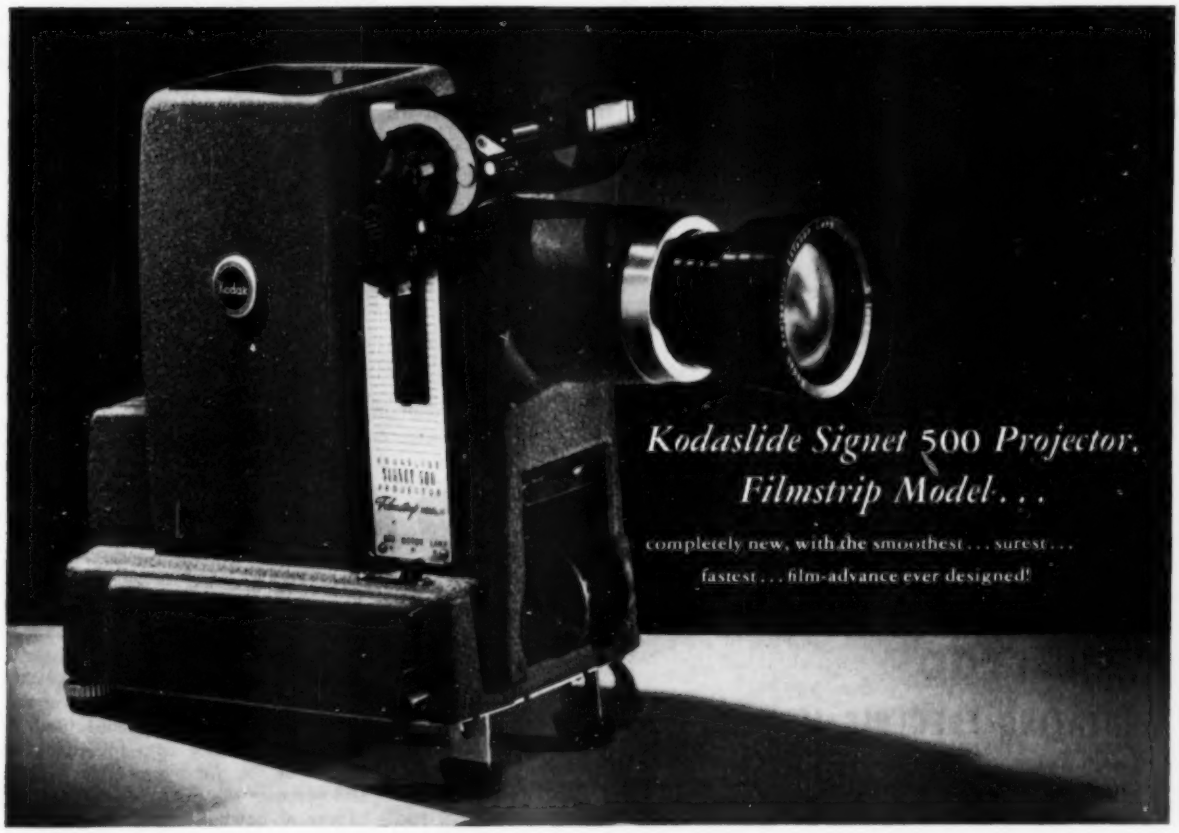
Write for Catalog Sheets

SHELDON MACHINE CO., Inc.

*Builder of Sheldon Lathes, Milling Machines, Shapers, and Sebastian Lathes*

4244 N. Knox Ave. Chicago 41, Ill.

# new slide-and-filmstrip projector by Kodak


Kodaslide Signet 500 Projector, Filmstrip Model . . .
completely new, with the smoothest . . . surest . . .
fastest . . . film-advance ever designed!

## It's new . . . all new . . .

a projector that in virtually every detail of its construction represents startling advances in design. Six of these important Signet features are detailed below—among them, the remarkable Geneva movement for smoother-than-ever filmstrip showings. Check over the details here . . . then see this brilliant new projector for yourself at your Kodak Audio-Visual Dealer's. Just mail the coupon for his name and address.

**1. Brighter, Sharper Pictures**—Superb Kodak Ektanon Projection Lens (*f*/3.5 or *f*/2.8), *Lumenized* lens-and-condenser system, aluminized glass reflector, and 500-watt lamp add up to amazingly bright, evenly illuminated pictures. Projection is so brilliant that in most cases there's no need for room darkening!

**2. Smoother Operation**—The Signet 500 is the only filmstrip projector with the famous Geneva movement—a precision mechanism that advances each frame in *smooth* sequence . . . so fast, viewers can hardly see the transition. No jumping, no jerking. Nylon gearing provides positive, quiet action . . . assures amazingly long life. Film is handled gently by the filmstop mechanism—glass pressure plates separate before filmstrip can move.

**3. Faster Setups**—Drop-in loading ends fuss because the easy-to-get-at sprocket engages the filmstrip *immediately*. Special framing lever makes centering fast and accurate. Rewind device permits quick refiling of films.

**4. Cooler Operation**—Operation is cool and safe because the special *impeller*-type blower delivers a far greater volume of air with less noise than formerly obtainable. Thick heat-absorbing glass protects film. And the multiple aluminum baffle system cools both projector and film.

**5. Automatic Leveling**—Individually spring-loaded front legs snap into position, automatically compensating for unevenness. Back leg adjusts for aligning picture on screen.

**6. Top Versatility**—The Signet 500 adapts easily to use as a 2 x 2 slide projector! Simply remove the filmstrip mechanism and slip in the slide-film changer *included with the projector*. The complete slide-and-filmstrip projector is just $98 (with *f*/3.5 lens).

*Price subject to change without notice.*

**EASTMAN KODAK COMPANY,** Dept. 8-V, Rochester 4, N. Y. 10-193

*Please send me the name and address of my nearest Kodak Audio-Visual Dealer and further information about the new Kodaslide Signet 500 Filmstrip Projector.*

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Kodak

## GLYCERINE

(Continued from page 22A)

sistance, and other qualities make glycerine invaluable in the production of glassine paper, vegetable parchment, and greaseproof wrappings that are especially suitable for packaging foods. With the advent of frozen foods, glycerine was called into use to prevent undue stiffness and brittleness in the containers and wrappers. The incorporation of a small amount of glycerine is standard practice in the production of facial tissues, paper towels, napkins and table cloths, window drapes, disposable diapers and similar paper products in which softness is prerequisite. It is used in many special treatments and finishes, and its presence in paper helps to offset curling, "dishing," and other characteristics that interfere with good printing.

One of the outstanding uses of glycerine is for plasticizing cellophane. Without a suitable softening agent like glycerine the cellophane film is brittle and useless. Up to about 25 per cent of the weight of the finished product is made up of the plasticizer. Even during the war, when glycerine was vitally needed in war munitions, a good proportion of the cellophane was plasticized with this fluid. Much of this material was reserved for packing foods, but some of it went into other special uses. Among these were the compact cellophane capes issued as a protection against poison gas attack. Dr. Louis Schwartz, formerly medical director, Division of Industrial Hygiene, United States Public Health Service, has recommended that cellophane placticized with glycerine be used to make protective cloths for workers because it is not affected by acids or petroleum solvents and guards the wearer against certain toxic gases and fumes.

Glycerine finds extensive utility in the production of writing, stamping, printing, and other inks. Alkyd resins are also finding increasing utilization in the production of superior lithographic and printing inks. Of major importance in the printing industry are glue-glycerine composition rollers which serve to pick up and distribute the ink evenly over the type so that it can be transferred to the paper. Although other types have been introduced, the composition roller remains the most used kind of printers' rollers, and, under suitable conditions, the glue-glycerine composition roller still yields the best printing results.

The plasticizing action of glycerine finds extensive employment when glue is used in the adhesives for binding books and magazines, for making cork composition products, and for other bonding purposes. Used in other types of adhesive pastes and mucilages, glycerine acts as a means of controlling the flexibility of these bonding agents so as to give them a maximum of strength under the conditions used. Not only does glycerine help to impart flexibility but, by its hygroscopic action, it also prevents the drying that would result in loss of bonding power.

A growing number of applications for glycerine are being found in the treatment and processing of metal products. For example, mixtures of glycerine and water may be used as quenching and tempering media for steel and other metals. In the region between oil quenching and water quenching it has been reported that steels of high elasticity and maximum hardness are obtained when glycerine is the major constituent of the quenching fluid. No dirt or other deposits are formed and traces of glycerine can be washed off easily.

Long used in certain electroplating and electristripping baths, and a standard component of the solutions for anodically coloring aluminum, glycerine has expanded its usefulness to include processes for the electropolishing of stainless steels and other metals. As explained by C. L. Faust of the Battelle Memorial Institute, the electropolishing process is replacing automatic and hand operated machines for finishing metal articles to a brilliant, mirrorlike appearance, for machining parts to size, for removing burrs from machined edges,

(Continued on page 27A)


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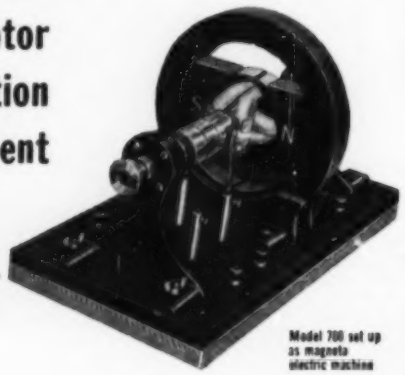
...teach DC-AC motor construction and operation by Visual Experiment

with CROW ELECTRI-KIT model 700



Model 700 set up as magneto electric machine

ROTATING ELECTRIC MACHINE

For the first time—a kit so simple, so practical that high school students can grasp the principles of electric motors, generators and alternators readily. Assemblies built from Model 700 components perform exactly like commercial machines, yet the kit's ingenious design makes it amazingly easy to assemble and operate.

- Same basic parts—baseboard, frame ring, axle and bearings—are used in every experiment.
- Kit can be used anywhere . . . no special wiring, floor space or floor load problems.
- Safe—cannot shock. Operates on six to 110 V. DC or 110 V. 60-cycle AC.
- Motors can be assembled and disassembled with only a screwdriver.
- Students see all parts and coils in operation at all times.

NEW, COORDINATED TEXT-MANUAL MAKES COURSE EASY TO TEACH, EASY TO LEARN!

- Completely new. 270 pages, 65% pictures.
- Reduces theory, assembly and operation of rotating electric machines to simplest possible terms. Course can be taught easily by instructors with very limited electrical training.
- Divides each experiment into four sections:
  1—Discussion of theory involved.
  2—Demonstration by instructor.
  3—Step-by-step instructions for assembly of machine.
  4—Comprehensive pictorial review.
- Assemblies cover 25 machines including . . .
  Permanent magnet generators and motors
  DC series shunt and compound generators and motors
  Commutation and interpoles
  One, two and three phase AC motors and alternators
  Maintenance and trouble shooting

On a cost per experiment basis, the Crow Rotating Electric Machine is by far the most economical equipment you can buy.

Write for complete details and prices

CROW ELECTRI-CRAFT CORP.

DIV. OF UNIVERSAL SCIENTIFIC CO., INC. • BOX 336G, VINCENNES, INDIANA

Draftsmen, engineers, designers, architects, looking for quality and reliability, have recognized K&E Leadership for 87 years. That is why K&E is their first choice for the tools and materials they work with.

The same K&E Leadership so long a tradition with the professionals, distinguishes the K&E School Line as well. K&E drafting instruments and materials for student use are priced right too. You can save money for your school system, as well as for your students, by making K&E your first choice.

When you are considering your new requirements or replacements consult the K&E 1954-55 School Catalog.

Have you had your copy? We shall be glad to send it to you or give you any information about K&E if you will drop a line to Keuffel & Esser Co., Hoboken, N. J.

**KEUFFEL & ESSER CO.**

EST. 1867

*Drafting, Surveying, Reproduction Equipment and Materials • Slide Rules • Measuring Tapes*

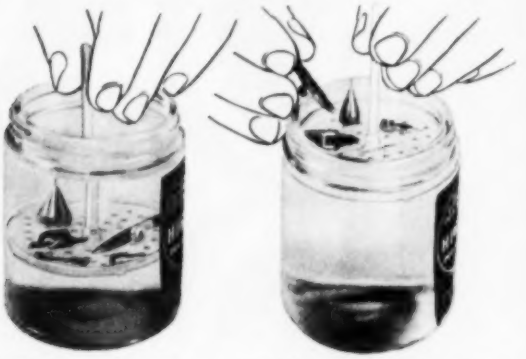
NEW YORK • HOBOKEN, N. J.
CHICAGO • ST. LOUIS • DETROIT • SAN FRANCISCO
LOS ANGELES • MONTREAL

For your added convenience ...a handy new

HIGGINS PEN CLEANER

package

It would be difficult indeed to improve on the popular cleaner which makes all your brushes, pens and instruments better than new... but we now make it even easier for you to use!



A plastic strainer in each new 6 oz. jar invites you to drop instruments and parts unconcernedly in cleaner.

Simply lift strainer to retrieve thoroughly cleansed instruments without soiling fingers and without clumsy fishing in jar.

ODORLESS
NON-INFLAMMABLE • NON-VOLATILE
HARMLESS TO HANDS, CLOTHING, BRUSHES, AND INSTRUMENTS

new 6 oz. jar

HIGGINS INK CO., INC., Brooklyn, N. Y.

"NONE BETTER"

REMEMBER THE NAME ... Rubyfluid

the easy-to-use Soldering Flux for neat strong unions.

Use Rubyfluid Flux — liquid or paste — to get neat, strong unions speedily and easily. Rubyfluid is a special fast acting formula, wets out freely, is free from harmful and objectional fumes, economical to use. Try it — send $1 for special offer — 1 pt. liquid, ½ lb. paste flux and helpful booklet.

For Stainless Steel use *Ruby's Stainless Steel Flux*, perfected for that metal.

77 C. McDowell Street Columbus 8, Ohio

RUBY CHEMICAL CO.

Rubyfluid

New, Large Metal
PROTEXEM
Paint Brush Conditioner
Designed for Shop Use

This new metal rectangular PROTEXEM Paint Brush Conditioner assures many years of service.

PROTEXEM'S Vapor Action has proved to be the best system for keeping brushes soft and ready for use for over 10 years.

You can put brushes away at the end of the day and they will be ready for use the next morning when class opens. A real time and brush saver.

Write for Information and Special School Price
WISCONSIN LABORATORIES, Inc.
Dousman, Wisconsin

## GLYCERINE

(Continued from page 24A)

and for getting surfaces ready for final finishing by electroplating, painting, lacquering, japanning, or anodizing.

The largest consumers of glycerine are the manufacturers of synthetic resins. Glycerine entered at an early stage into the production of resins that are particularly well suited to the formulation of superior protective coatings. It has often been said that ester gum, resulting from the chemical reaction between glycerine and rosin, was the first synthetic resin to be used in the manufacture of modern paints. While ester gum and its various modifications are still important, present interest centers chiefly around the alkyd type resins. The most important of these resins are obtained as a result of the reaction between glycerine and phthalic anhydride or other polybasic acids. The use of various modifying agents and variations in manufacture permit the production of an almost infinite number of alkyds to meet many different requirements.

Modifications of this kind have yielded alkyd resins that are useful in textile and paper treatments, in ink manufacture, as bonding agents, for making sealing compounds, and for numerous other purposes. Despite this growing diversification, the production of protective and decorative coatings still remains the most important outlet for these synthetic resins. Their importance in the production of many kinds of paint, varnish, lacquer, or enamel is reflected in the fact that for several years the alkyd type of resin has sold in greater volume than any other type of resin used in surface coatings.

The reasons for this status are not hard to find. Although alkyd resins may be classed comparatively as newcomers, they have proved thoroughly their ability to provide the optimum combination of properties for the largest number of coatings. Finishes made with the proper alkyd resin bases possess excellent adhesion to most surfaces, good color retention, and excellent weathering characteristics. They have hardness, flexibility, moisture, and solvent resistance, withstand the action of many chemicals and show little change in gloss, even after long exposure periods. In short, alkyd resins are adaptable to practically every phase of coating where superior qualities are essential to provide protection from wear, tear, and the elements.

Although alkyd resins had shown their superiority in the formulation of quick-drying, durable exterior and interior finishes, in automobile paints and refrigerator enamels and in many other coatings, the way in which alkyd-containing paints stood up on all kinds of military and naval equipment really proved their outstanding ability to "take it." Wartime research led to further improvements, among them being the production of efficient fire-retardant paints with alkyd resin bases. Solvent shortages during this period led to improvements and wider utilization of emulsion or water paints based upon aqueous dispersions of alkyd resins. Still maintaining their popularity, these find wide utility as exterior paints for cement, concrete, cinder blocks, and similar surfaces. Their quick-drying properties, freedom from odor, and durability have made these emulsion paints popular as interior wall paints for homes, offices, hospitals, and public buildings.

## MOTTOES AND QUOTATIONS DO HELP

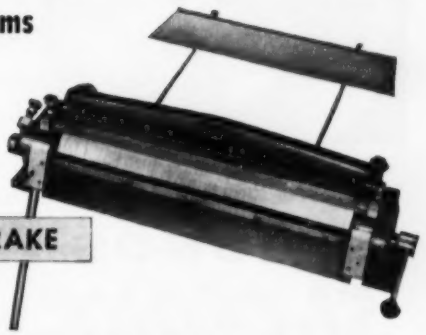
RALPH C. MAYO
Teacher-Coach
South High School
Worcester Vocational Teacher
Worcester Boys' Club
Worcester, Mass.

If you were to visit the industrial-arts room at South High School, Worcester, Mass., where mechanical drawing and

(Continued on next page)

BERKROY 24" SHEET METAL TOOLS

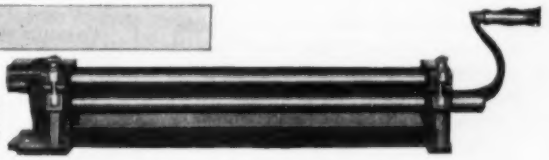
Enlarged Training Programs Possible With These Production Tools of Advanced Design



24" BOX AND PAN BRAKE

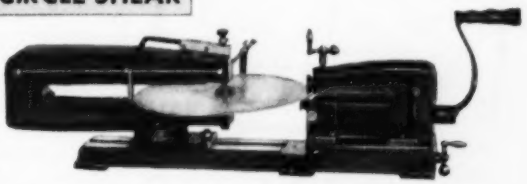
Turning a knob provides infinite adjustment to any angle from 0° to 135°. Forms any size box or pan from ⅛" to 24" by ¼" graduations. Makes intricate folds, reverse bends and radius bends on sheet steel up to 16 gauge and up to 24" wide. Bending leaf operates on Torrington Needle Bearings. Full 1" clearance between top fingers and anvil. Maximum 2½" box or pan depth permits deeper bends.

24" SLIP ROLL



Finger-tip controls on both ends of top roll permit quick adjustment for any material thickness within capacity of unit. Will accurately roll 24" widths in 20 gauge mild steel—heavier gauges in narrower widths. Removal of work is easily accomplished due to the spring loaded, hinged, top roll. Heavy duty rolls 1½" diameter—distortion proof channel iron base, enclosed gears and oilite bearings are a few of many features.

24" RING AND CIRCLE SHEAR

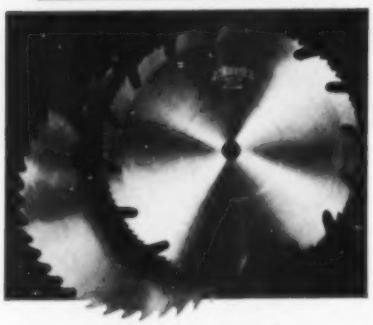


Equipped with MICRO-FEED control of circle diameters—an exclusive feature. Cuts rings and circles up to 24" diameter. Handles a wide variety of trimming operations, strip cutting and contour cutting on sheet metal up to 20 gauge. Cutters are hardened, tempered tool steel. 32" x 7" bed length, 12" x 4½" shear, and 21" x 3¾" clamping head. Accurately machined, enclosed gears and rugged construction throughout.

SOLD THROUGH INDUSTRIAL DISTRIBUTORS

For catalog information, write to
BERKROY PRODUCTS, INC.
2312 N. ONTARIO STREET • BURBANK, CALIFORNIA

Get More Out of Your Power Saw



with SIMONDS SI-CLONE SAWS

To make the most of any power saw you need more than one type of blade. Simonds makes 13 different types — a type for every purpose: ripping, cutting-off, mitering, grooving, metal cutting, etc. Sizes up to 12" diameter to fit any machine. Now at popular prices — carrying the full Simonds *Guarantee*. Get these edge-holding, fast cutting saw blades at your local hardware or mill supply dealer.

RIP • CUT-OFF • COMBINATION

6" — $1.75
7" — 2.00
8" — 2.15

9" — $2.65
10" — 3.15
12" — 4.35

Supplied with round or special shape holes

**GUARANTEE** — Made of Simonds steel fully guaranteed against any defect in material or workmanship.

SIMONDS SAW AND STEEL CO.
FITCHBURG, MASS.

*Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon, Canadian Factory in Montreal, Que.*


## MOTTOES & QUOTATIONS

(Continued from previous page)

working are taught, you would see many mottoes and quotations such as:

Look around, but be square.

Never stop on the 10-yard line to pat yourself on the back, for you'll never make the goal.

A person must have lots of strength to overcome his greatest weakness.

The best angle from which to get at anything is the try-angle.

On window ventilators made by the students, we see such sayings as:

Be on time. Be courteous. Be clean. Be cheerful. Be a worker.

When your pupils find out that you are interested in mottoes, they will bring them in. Here are a few that pupils have submitted:

I'd like to pay you what you are worth, but the minimum wage law won't permit it.

The last time I passed the course was the last time I tried.

Don't make excuses — make good.

Never admit you're discouraged, even to yourself.

Many of these posters with mottoes will have a cartoon drawn on them, i.e., He climbs highest who helps another up. The picture depicts one man helping another up a steep mountain.

These are only a few of the many sayings that are changed monthly by the students. You will find these mottoes will help you in your teaching. However, if you quote sayings in your classes, or on the baseball field, be sure you live up to them. For example: You are as big as the things you do.

Gain the respect and admiration of your students by practicing what you preach and your discipline troubles will be nil.

Mottoes pay off. During the past twenty years letters have been received from former pupils who quote a saying word for word, such as:

To those who talk, talk, talk, this maxim should appeal; the steam that blows the whistle never turns the wheel.

Any day may be the most important day of *your* life.

Bulletin boards are a great asset, if they are strategically located. Here, the pupils find information about former students, sports, mottoes, etc. The industrial-arts bulletin board at South High School is located in the corridor where pupils have their recess. Some days I have seen as many as 25 pupils clustered around the glassed-in bulletin board, reading a letter from a former pupil, urging his pals to give their best in the search for knowledge; or a Christmas card to all the boys from some distant land.

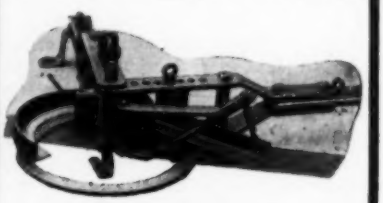
How far-reaching these mottoes and quotations are in character-building, or

(Continued on page 30A)


*Teacher's pet . . .*

HOSSFELD UNIVERSAL® IRON BENDER

**Wrenchless Type — Model #1**
**Bends Flat, Round, Bar, Angle, Pipe**



*Samples of Bar Bending*

HUNDREDS of shop instructors in vocational training departments of schools and municipal, state and government institutions are sold on the merit and utility of the Hossfeld Bender. Their maintenance departments, too, recognize it as practical and indispensable in the shop as a bench vise, capable of replacing a half dozen special machines. Proved in thousands of factories and repair shops as well, the Hossfeld Bender will neatly, quickly and accurately teach your students the 101 different bending jobs that they will be called on to perform in repair, maintenance and production work. For a better bender — specify Hossfeld.

SPECIFICATIONS

#1 Bending Capacities
Standard Pipe & Conduit — up to 1½" I.D.
Heavy Bends, Direct on Center Pin; "U" Bends on Cam Dies, 3" x 7/16" flat or ¾" Round or Square Cold
Sharp Square Bends — 3" x ½" Cold
Ornamental Iron Work — 2" x 3/16" Flat or ½" Round or Square, Cold
Eye Bolts — ½" Round or Square, Cold
Angle Iron — 1¼" x 1½" x ¼", Cold
Automobile Spring Eyes — 3" x ⅜", Hot
90° Bends on Conduit, Heavy Wall, or Standard Pipe — 1" Cold

GET THE FACTS!
Write today for illustrated bulletin.

HOSSFELD MFG. CO.
438 W. 3rd Street Winona, Minnesota

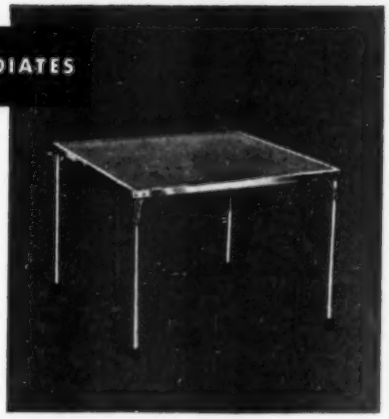
# BROADEN YOUR MANUAL TRAINING PROGRAM!

**FOR BEGINNERS**

Modern End Table, single or nesting sets. A simple, quick and useful project for the younger students.

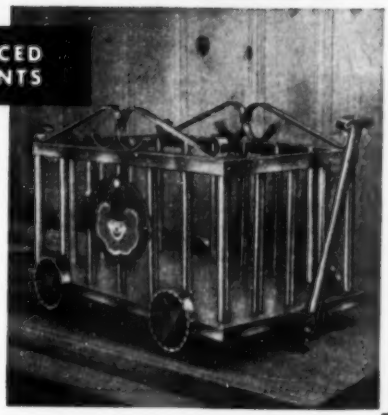
**FOR INTERMEDIATES**

Folding Card Table. Inexpensive and fun to make. Encourages students to try more difficult projects.



**FOR ADVANCED STUDENTS**

Circus Wagon Toy Hopper perfectly suited to the talents of older students. Teaches a variety of operations.



## REYNOLDS *Do-It-Yourself** ALUMINUM

### ...as easy to use as wood with just woodworking tools!

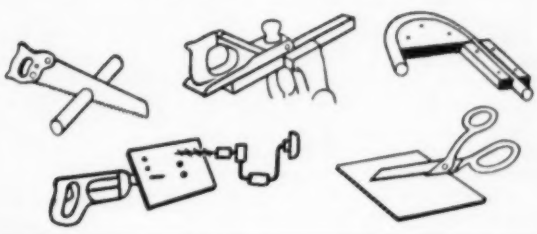
You can plan more projects, spend more time *teaching*, with Reynolds *Do-It-Yourself* Aluminum. It's specially engineered for amazing workability to bring metalcraft within the scope of even your youngest beginning students. It can be bent, sawed, drilled, planed and jointed simply and easily, with only standard woodworking tools.

Reynolds *Do-It-Yourself* Aluminum is inexpensive. You can use it economically in all of your continuing, coordinated vocational programs. And it's so easy to use you'll get a higher percentage of good results—projects your students will take home with pride. Turns out beautiful finished products every time—in gleaming, long-lasting rustproof aluminum. Send a postcard today for full details on this new easy-to-work material.

*T. M. Reynolds Metals Company

**WOODWORKING TOOLS** are all you need for Reynolds *Do-It-Yourself* Aluminum. Use standard hand or power woodworking tools to cut, bend, shape or smooth it.

**CAUTION:** This new material is approved by leading tool makers. You are cautioned, however, to use only Reynolds *Do-It-Yourself* Aluminum because other types of aluminum may harm tools.



**REYNOLDS *DO-IT-YOURSELF* ALUMINUM**

*consists of:*

TUBING • RODS • BARS • ANGLES • WIDE VARIETY OF SHEET DESIGNS
SCREEN AND STORM SASH SECTIONS • FASTENERS • TRIM STRIP
WINDOW HARDWARE • REYNOLON PLASTIC FILM

REYNOLDS DO-IT-YOURSELF* ALUMINUM

**WRITE FOR INFORMATION**

free "how-to" booklet and description of easy-to-follow plans. Address:

**REYNOLDS METALS COMPANY**
**2479 South Third Street, Louisville 1, Kentucky**

## MOTTOES & QUOTATIONS

(Continued from page 28A)

giving a boy or girl a challenge, no one will ever know, but as teachers, we know they do help.

---

New demands for petroleum have brought orders for oil tankers that rival the size of big passenger liners. Some tankers, including two now under construction, will be 45,000 tons. — *Petroleum Newsnotes.*

## *News Notes*

### RECIPIENTS OF IIEA MERIT CERTIFICATES

Doyle Collier, presently a shop teacher in the new Adams Central High School, Indianapolis, Ind., is one of the 1954 recipients of the IIEA Merit of Awards annually presented at the Spring Convention of the Indiana Industrial Education Association.

Mr. Collier is a successful general shop teacher who recognizes no limits in the number of centers of experiences offered. His projects are boys and girls.

Maynard E. Davison, who is teaching industrial arts at the Honey Creek Township School in Vigo County, Ind., also received a similar merit award.

### FISHER BODY CRAFTSMAN'S GUILD MODELS

The 1954 Fisher Body Craftsman's Guild model car competition ended at midnight, June 1.

For the first time in the history of the Guild, the young designers were offered the opportunity to build sports cars, hardtops, convertibles, or station wagons, as well as two- or four-door sedans.

Fourteen award winners were selected for each state and the District of Columbia, evenly divided between the junior (12 through 15) and senior (16 through 19) age divisions. These state winners were then matched against other state winners in their regions for the regional awards — 40 in all — which were expense-free trips to the Guild convention held in Detroit in July.

State awards, in each age division, were $150 for first; $100 for second; $50 for third; and four honorable mentions of $25 U. S. Savings Bonds. At the national convention eight winners were selected to receive university scholarships, two each in the amounts of $4,000, $3,000, $2,000, and $1,000.

To date the Craftsman's Guild has awarded 123 university scholarships worth $400,500. More than $600,000 in cash and other awards have been made to more than 10,000 state and regional winners.

♦ A week-long industry seminar was held August 16 at the Westinghouse Educational Center, Pittsburgh, Pa., for 37 college professors and instructors, most of whom have been working since mid-June at plants of Westinghouse Electric Corporation as part of an annual industrial experience program.

Assigned to positions in various operating divisions of the company have been 23 educators from leading U. S. colleges. They were joined during the seminar by 14 others who were guests of Westinghouse. In addition to the engineering field, the list includes teachers in economics and English.

The theme of the seventh annual seminar was "New Horizons."

♦ Two graduate fellowships have been established at Illinois Institute of Technology, Chicago, by the Ingersoll Milling Machine Company, machine tool manufacturer of Rockford, Ill., through the Ingersoll foundation.

The fellowships were established to advance the contribution of the machine tool industry to science and society, and to assist young engineers to secure specialized training in the conduct of fundamental research.

For further information about these fellowships, write to *Dr. W. E. Lewis, dean of the Graduate School of Illinois Institute of Technology, Chicago 16, Ill.*

♦ Designation as a teacher training institution for trade and industrial education has been given Western Michigan College in action taken recently by the Michigan State Board of Control for Vocational Education.

Not only does this sanction training being done at Western Michigan, but it also qualifies the college to receive state and federal reimbursement, the latter coming under the Smith-Hughes Act of 1917 and the George Barden Act of 1946.

Since World War II Western Michigan has been training teachers in the trade and industrial field, qualifying them for state certification. But such training has been done without any outside financial aid.

Western Michigan has also for the past several years trained teachers in distributive education, with state and federal aid.

♦ A new system of alloy designations for

(Continued on page 32A)

CHALLENGE PRESENTS
CUTTERAMA
Diamond (Hydraulic Clamp) Power Cutter
Diamond (Hand Clamp) Power Cutter
Challenge 370 Automatic (Hydraulic Clamp) Cutter
Challenge 193-265-305 (Hand Clamp) Power Cutter
Challenge 265-305 (Hydraulic Clamp) Power Cutter
Challenge 265-305 Lever Cutter
AN ALL-STAR SHOWING OF AMERICA'S MOST DEPENDABLE LINE OF CUTTERS!

Put yourself in the picture — with a rugged Challenge Paper Cutter that's as right for you as profit itself!

Shown here are some of the fine models that help make Challenge the most extensive and popular line in the country today. In all, there are 7 styles and 6 sizes to choose from, ranging from lever cutters in bench and floor models — to power cutters with hand or hydraulic clamp. Each has been built to one standard of quality — *Challenge quality* — with special emphasis on *safety . . . speed . . . and sureness of operation.*

Yes, the Challenge line of dependable paper cutters is truly panoramic in scope. Every style . . . every size . . . designed to save you time, labor and money — and insure more profitable cutting. Write for full details today. 762

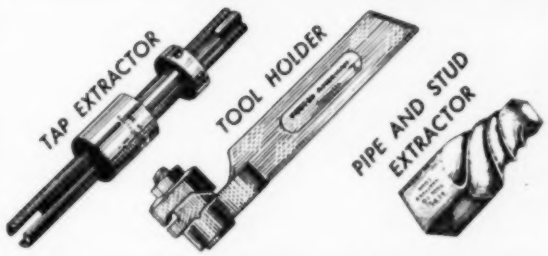
**THE CHALLENGE MACHINERY CO.**

Office Factories and Show Room: Challenge GRAND HAVEN MICH.

TRADE-MARK ®

Challenge Owns The Printing Equipment Manufacturing Rights of Morgans & Wilcox Manufacturing Co.

## WALTON *SPECIALIZED* TOOLS




**Used in Many School Shops to Train Metal Working Students in *Time Saving and Parts Salvage***

**WALTON TAP, PIPE & STUD EXTRACTORS**

Used extensively in metal working shops throughout industry to remove broken taps, pipes, and studs. Quick, easy, inexpensive. They save time, and salvage parts otherwise scrapped.

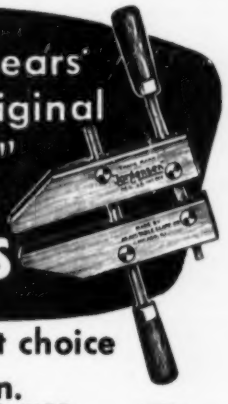
**WALTON-AMERICAN TOOL HOLDERS**

A universal holder, adjustable to straight, right or left hand offset positions. This holder saves time by allowing changes to be made at the machine without removing holder.

Write for descriptive literature of all three tools, contained in our catalog No. 32. Also Free Trial Offer.

**THE WALTON CO., Hartford 10, Conn.**

for over 50 years the famous, original "Jorgensen" **HANDSCREWS**



**have been the first choice of skilled craftsmen.**

When you see the trade mark "JORGENSEN" stamped on each jaw, you will be sure of clear, straight grain hard maple jaws, properly seasoned and manufactured in our own plant . . . cold drawn steel spindles . . . and hard maple handles that will not come loose. Insist on carefully fitted "JORGENSEN" Handscrews, famous for jaws that stand-up under severe service.

Angle of jaws adjustable to fit the work.

*insist on genuine* "Pony" **CLAMP FIXTURES**

Easily mounted on ordinary black pipe to make economical, fast operating bar clamps. Many styles. Send for . . .

**free catalog of Bar Clamps, "C" Clamps, Press Screws, etc.**

**ADJUSTABLE CLAMP CO.**
**424 No. Ashland Ave. • Chicago 22, Ill.**

**PROVED IN INDUSTRY always dependable**

Over 3,885 lbs. Actual Shearing Strength per Square Inch

## ROGERS

Used by Furniture Manufacturers — Cabinet Makers — Carpenters — Craftsmen — Upholsterers — Shoe Manufacturers—and in factories, shops and homes, wherever Dependable Glue is Needed.

TRY ROGERS IN YOUR SHOP — Ready to Use — Easy to Use — Always Uniform — Economical. Prove to Yourself why ROGERS IS BEST!

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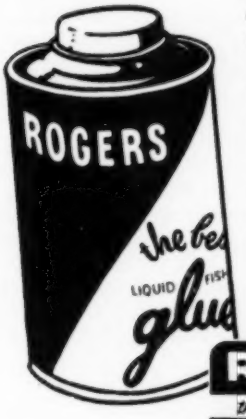

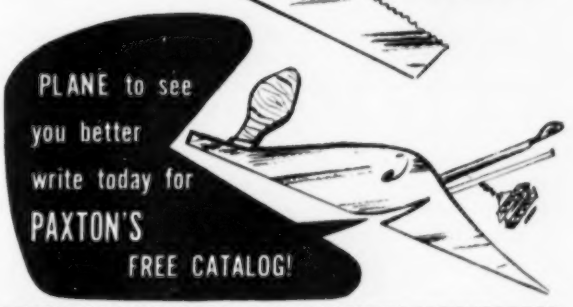


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## NEWS NOTES

(Continued from page 30A)

wrought aluminum and aluminum alloys has been developed by The Aluminum Association, 420 Lexington Ave., New York 17, N. Y., and is about to go into operation. It was officially approved by the Association at its 1954 summer meeting as "The Aluminum Association Alloy Designation System for Wrought Aluminum," and the new designations will become effective October 1, 1954. Membership of The Aluminum Association accounts for all the primary aluminum produced in the United States and more than 85 per cent of wrought aluminum products. The temper designations in effect since 1947 are being continued without change and, as in the past, will follow the alloy designations developed years ago. For copies of this pamphlet see your suppliers.

♦ A new program of study in industrial management will be offered by the University of California, Santa Barbara College, beginning with the fall semester.

To be given as a curriculum within the industrial-arts major, a part of the Division of Applied Arts, the new offering has strong emphasis on general education, combining it with the knowledge of industrial skills through shop and laboratory experience. The program is designed to prepare individuals for managerial positions in service or manufacturing industries or as a basis for graduate work.

For more detailed information write to the *Office of Public Information, University of California, Santa Barbara College, Santa Barbara, Calif.*

Instructor observes wave forms with viewing attachment before making oscillogram


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**YOUR COPY** of this 16-page bulletin, GEA-5526, containing information on the specially designed G-E Educational Equipment for electrical laboratories is available on request.

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♦ Of interest to woodworking instructors of industrial arts and vocational education is the new circular, Series C59, recently issued by the Small Homes Council of the University of Illinois, Urbana, Ill.

The subject of this publication is "Garages and Car Ports," and it and others of the series on small homes may be obtained by writing to the university. The cost of the separate circulars is 10 cents.

♦ A partial list of graphic-arts industry scholarships has been compiled by the Education Council of the Graphic Arts Industry, Inc., 719 — 15th St., N.W., Washington 5, D. C.

♦ The Harry E. Wood School, Indianapolis, Ind., has been designated as the city's eighth public high school and pupils now enrolled there will continue attending classes until graduation.

The new high school, which now has grades 7 through 9, will add a new grade each school year until by September, 1956, it will be a six-year school, offering its pupils a regular high school diploma.

♦ Formal dedication ceremonies for the new $4,500,000 Emmerich Manual Training High School were held recently at Indianapolis, Ind.

♦ A total of 79 high school pupils have enrolled in the cadet teaching program of the Indianapolis, Ind., schools this past semester. This is the largest enrollment in the two years the program has been in operation. The cadet program is designed to encourage high school pupils to enter the teaching profession.

♦ Before long Berne, Ind., will be able to boast of a new shop. It will be a combination of industrial arts and farm shop.

Hoagland School in Fort Wayne is also being remodeled.

♦ Construction is well under way on a new building for the Industrial Arts-Vocational shop classes of Crown Point High School, Crown Point, Ind. The building will be 75 by 200 ft., and will contain the following: large general shop areas for machine shop, drafting room, related lecture room, farm shop, farm shop lecture room, blueprint room, storage areas, three offices, and washrooms. The new building should be completed around November 1, 1954, according to present estimates.

♦ Continuing their aim and policy of purchasing one machine per year, the machinist club of Crown Point, Ind., High School, purchased a new No. 5 Wells Band Cutoff Saw. This replaced the old Marvel Draw saw which has been given to the shop by Hammond Technical High School.

The money to buy the machines is raised by sponsoring two school dances throughout the year, and by sponsoring the annual interclass club tourney.

To date the club has spent approximately $2,100 on new and used equipment for the high school machine shop. The club was organized and started by Lester Hale in 1946.

Present sponsors are Lester Hale and John DuBall.

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* * *

In 1953, the United States produced more than 54 billion gallons of motor fuel. — *Petroleum Newsnotes.*

**Instructor Donald C. Thiel** at the Valley Road School, Princeton Township, N. J., not only preaches safety—he practices it too! Note safety zones and non-skid mats. Note also that all machines are Walker-Turner, the **light-heavyweights** designed for standout safety and effective teaching.

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# New Publications

### Metalwork for Students

By R. Marriott. Cloth, 222 pp., 5½ by 7½ in., illus., $2.50. St. Martin's Press Inc., New York 17, N. Y.

This is an interesting little text which will give the beginner in machine-shop work an understanding of how ferrous and nonferrous metals and alloys are produced; how bench-metal work is done; how the blacksmith works; how sheet-metal work is produced; and how the machinist uses the lathe.

### Applied Atomic Energy

By K. Fearnside, E. W. Jones, and E. N. Shaw. Cloth, 156 pp., 5 by 7½ in., illus., $4.75. Philosophical Library, New York, N. Y.

This book provides the background which the student needs to understand the comparatively newly introduced radioactive isotopes and their application to atomic energy for peaceful purposes.

The 11 chapters treat of modern nuclear physics; nuclear reactors; preparation and distribution of radio isotopes; stable isotopes; legal aspects of atomic energy; techniques; and radio isotopes in research biology, medicine, agriculture, and industry.

### How to Install and Service Auto Radios

By Jack Darr. Paper, 116 pp., 5⅜ by 8¼ in., illus., $1.80. John F. Rider Publisher, Inc., New York 13, N. Y.

This book is intended for the electrical student but also for the commercial auto radio serviceman.

The book is written in clear and understandable English, and the illustrations are well made.

The instructions explain how to install and service auto radios, and how to lay out and equip an auto radio service shop.

### How to Use Portable Power Tools

By Maurice H. Reid. Cloth, 210 pp., 5½ by 8¼ in., illus., $2.95. Thomas Y. Crowell Co., New York, N. Y.

In this power age we have all learned the advantage of using power instead of muscle.

This book explains just how to use the electric drill, portable saw, sander and finisher, the combo tool and drill kits, the router, shaper, and planer. The book also emphasizes safety, tool maintenance, and good working techniques.

### Teaching Rapid and Slow Learners in High Schools

A group project in secondary education written by Arno Jewett, J. Dan Hull, Kenneth E. Brown, Howard H. Cummings, Philip G. Johnson, Mary Laxson, John R. Ludington, Berenice Mallory, and David Segel. Paper, 97 pp., 5¾ by 9⅛ in., 35 cents. U. S. Government Printing Office, Washington 25, D. C.

This study took up the phases of administrative provisions for rapid and slow-learning pupils, instructional provisions, and improving instruction in local communities.

The material is interspersed with a number of tables.

### Home Repairs and Improvements

By Emanuele Stieri. Paper, 375 pp., 5⅛ by 8⅛ in., illus., $1.50. Barnes & Noble, Inc., New York 3, N. Y.

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Directions are also given on making concrete and masonry repairs and improvements, and how to lay brick, concrete blocks, and glass bricks.

### The Aluminum Data Book

Looseleaf, board binding, 214 pp., 6 by 8¾ in., illus., $1. Reynolds Metals Co., Louisville 1, Ky.

This 1954 edition of *The Aluminum Data Book* features much new information not found in previous issues, and it is thumb-indexed. It offers detailed data on the properties and characteristics of aluminum.

To make this vast collection of information readily available, the book includes a table of contents, a 2-page index of tabular matter, and a 20-page itemized cross index with references both to text and tabular information.

### Corrosion Testing Procedures

By F. A. Champion. Cloth, 369 pp., 5⅝ by 8¾ in., illus., $6.25. John Wiley & Sons, Inc., New York, N. Y.

This book is ideal for the student, the beginner in the laboratory, or the laboratory technician who wants to compare his techniques with those employed by others.

The book discusses the subject from the standpoint of size, shape, and preparation of metal specimens; the corrosion media, exposure conditions; the study of conjoint action; field and service tests; cleaning specimens after corrosion; assessment of specimens after they are corroded; effects on the environment; special tests; and interpretation of results.

### Composing in Space

By Richard G. Wiggin. Paper, 48 pp., 6⅞ by 9⅞ in., illus., $1. McKnight & McKnight Publishing Co., Bloomington, Ill.

An interesting booklet on space composition for teachers of the arts, architects, and art students.

The booklet discusses architectonic space, emotional sensitivity to the visual characteristics of art forms, contrast of shape character and shape direction, contrast of colors, contrast of textures, elements of architectonic space composition, characteristics of a plane, organizing tensions between planes, guiding factors in designing space composition, and problems.

### Metals and How to Weld Them

By T. B. Jefferson and Gorham Woods. Cloth, 326 pp., 5⅞ by 8⅞ in., illus., $2. The James F. Lincoln Arc Welding Foundation, Cleveland 17, Ohio.

This book on arc welding is intended for the instructor, supervisor, or leader who wants concise and clear information on metals and how they are welded.

It explains the structure and properties of commonly used metals and how they are affected by welding. Gives correct procedure for welding steels, cast iron, and hard facing. It also explains how to make good welds and how to avoid trouble when welding.

The book has a large glossary of welding terms and useful tabular data.

The first six chapters of the book are devoted to an elementary discussion of metals,

(Continued on next page)

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## NEW PUBLICATIONS

(Continued from previous page)

their mechanical and physical properties, how to identify them and how to use them. These chapters also give a fundamental knowledge of the internal structure of metals and what happens to this structure during welding.

### Raising Livestock

By George P. Deyoe, W. A. Ross, and W. H. Peters. Cloth, 540 pp., 6¼ by 9¼ in., illus., $4.60. McGraw-Hill Book Co., Inc., New York 36, N. Y.

This is the second edition of this text which is exceedingly useful to the student in the agricultural school, as well as to the livestock raiser who will find in it excellent reference material for improving his business.

The contents of the book explains about engaging in the livestock business, how to select livestock, proper feeding methods, housing and equipment needed for livestock raising, care and handling methods, planning a health program for the stock, breeding and improving the stock, keeping records, and marketing, preparing, and processing livestock products.

### Applied Psychology for Employees

By C. H. Lawshe and Leon Thomas. Paper, 30 pp., 5½ by 8¼ in., illus., 50 cents. American Technical Society, Chicago, Ill.

An interesting and profitable analysis of seven principles of human behavior which cause much of the troubles between co-workers and between employers and employees.

The little booklet will be a great help to those who tackle these interpersonal troubles with an open mind.

### Women's Apparel Trades for Vocational High Schools

Compiled by C. Frederick Pertsch and Ethel F. Huggard, under the direction of Morris E. Siegel and William H. Bristow. Paper, 76 pp. Bulletin No. 4, 1952–53. New York City board of Education, 110 Livingston St., Brooklyn 2, N. Y.

This booklet was prepared by the New York City vocational high schools to serve as a guide in offering vocational curricula to young people about to enter the clothing industry. While the syllabus deals primarily with trade aspects, the work of the school goes beyond the teaching of trade skills. Suggestions are given on aims and methods of instruction, evaluation of instruction, planning, organizing and managing a trade classroom, and related technology. There is a bibliography of basic reference works and an appendix containing films, sources of teaching aids, and a list of manufacturers of equipment.

### Lubrication of Industrial and Marine Machinery

By William G. Forbes, revised by C. L. Pope and W. T. Everitt. Cloth, 351 pp., 6 by 9¼ in., illus., $6.50. John Wiley & Sons, Inc., New York 16, N. Y.

This book should be of great help to students as well as to workers in industrial plants. It is a second edition and the revision has been done by C. L. Pope and W. T. Everitt.

It discusses the chemistry of petroleum, distillation of lubricating oils, refining and dewaxing, blending, solid lubricants, additives, physical and functional tests, greases, synthetic lubricants, specifications, ball and roller bearings, purification and reclaiming, steam engines and turbines, hydraulic systems and turbines, air compressors, vacuum pumps, pneumatic tools, refrigerating machines, internal combustion machines, heat treating and cutting oils.

### Elementary Tool Design

By Elmer B. Benson. Cloth, 224 pp., 7 by 10 in., illus., $4.76. Chas. A. Bennett Co., Inc., Peoria 3, Ill.

The author of this text on beginning tool design is a professional gauge design engineer. His background is composed of a variety of experiences in industry including drafting, engineering, and designing. He is a member of the American Society of Tool Engineers, and a past chapter chairman.

*Elementary Tool Design* shows how to design the special devices that shape and hold the parts that are being produced.

This book is a splendid teaching aid for a preparatory course in tool design or tool engineering in high schools, vocational schools, colleges, adult evening courses, or industrial (plant) training courses. It treats the subject in a progressive manner based on the assumption that the reader has only knowledge of mechanical drawing and machine-shop practice.

### Plastics for Fun

By Alexander F. Bick. Cloth, 96 pp., 7¼ by 10¼ in., illus., $3.25. The Bruce Publishing Co., 400 N. Broadway, Milwaukee 1, Wis.

The author of this book is an industrial-arts

(Continued on page 38A)


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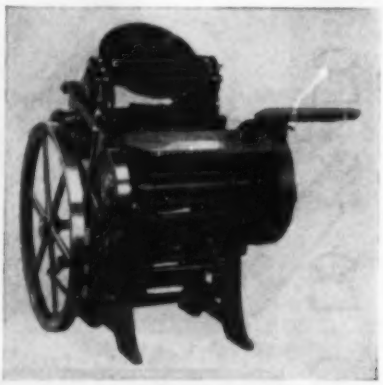

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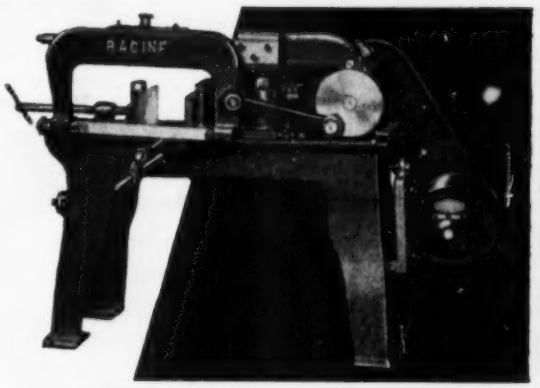


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## NEW PUBLICATIONS

(Continued from page 36A)

teacher. He also has been a commercial designer. By nature, he is interested in artistic work with materials of many kinds. This book on plastics proves the value of these varied experiences, and students and homecrafters will be pleased with the projects described within its pages.

In the seven chapters of the book the author presents directions for design, explains how to work with sheet plastics, make simple projects and apply required processes, make projects requiring the pressing of plastics, do figure carving, make a number of heavy plastic projects, and finally, he explains how to cast plastics.

### Craftwork in Metal, Wood, Leather, Plastics

By Franklin H. Gottshall. Cloth, 144 pp., 8 by 11⅛ in., illus., $4. The Bruce Publishing Co., 400 N. Broadway, Milwaukee 1, Wis.

A fine book of excellently designed projects for the craftwork class.

There are 17 items of metalwork, 10 of woodwork, 6 of leather, and 10 made of plastics.

### Arithmetic for Printers

By J. Woodward Auble. Cloth, 188 pp., 5¾ by 8⅛ in., illus., $2.72. Chas. A. Bennett Co., Inc., Peoria 3, Ill.

This is a revised and enlarged edition of this well-known text.

While the book is designed mainly for the beginner, it is equally well adapted for the use of the apprentice or as a reference book for the journeyman printer.

It describes the use of the fundamental arithmetical operations; the point system; spacing; job estimating; the micrometer; copyfitting; ratio and proportion; problems on weights, size, and quantity of paper; estimating quantity of ink used; job planning; and time problems.

### I Find My Vocation

By Harry Dexter Kitson. Cloth, 282 pp., 5¾ by 8⅞16 in., illus., $2.80. McGraw-Hill Book Co., New York 36, N. Y.

This is the fourth edition of this helpful vocational guidance book.

The book helps the young seeker into the future: what vocations he can choose from, what they offer in the way of remuneration, what he can learn about vocations from various sources, what he can learn from workers, how he can appraise his own vocational potentialities, what he must do to prepare for a given vocation, how to act on the job, how to get his social security number, information about unemployment compensation, vocational problems of rural youth and of young women, and the value of a hobby to the worker.

### The Art and Antique Restorers' Handbook

By George Savage. Cloth, 140 pp., 5½ by 8¾ in., $4.75. Philosophical Library, New York, N. Y.

An extremely interesting book filled with directions for cleaning, restoring, and preserving works of art of all kinds.

It gives many formulas that the author has found helpful in his work in this field of work.

### Fundamentals of Transistors

By Leonard M. Krugman. Paper, 140 pp., 5⅜ by 8½ in., illus., $2.70. John F. Rider Publisher, Inc., New York 13, N. Y.

An explanation of what a transistor is and what its function is in the field of electronics.

The seven chapters discuss basic semi-conductor physics, transistors and their operation, the grounded base transistor, the grounded emitter and grounded collector transistor, transistor amplifier, transistor oscillator, and transistor high-frequency and other applications.

### A Stranger at Our Gate

By Hubert H. Humphrey, Jr. Paper, 28 pp., 5¼ by 7⅛ in., 25 cents. Public Affairs Pamphlet No. 202. The Public Affairs Committee, Inc., 22 East 38th St., New York, N. Y.

An explanation of America's Immigration Policy.

### Safety Starts Here — Think

Paper, 32 pp., 4 by 6½ in., illus., obtainable by writing to Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.

A brochure on recommended safe practices in cutting and welding.

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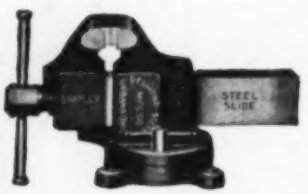
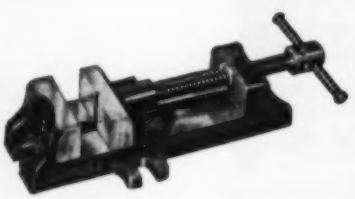
The United States has increased its oil and natural gas consumption at a rate of ten per cent a year since the war, to the point where it now consumes twice as much as it did in 1940. — *Petroleum Newsnotes.*


the complete line of quality vises for school shops

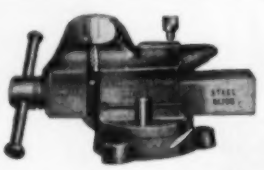


machinists vise

woodworker's vise



drill press and milling machine vise



utility vise

Vises are not all alike. There are definite reasons why Desmond-Simplex vises, even though they cost no more, give more value.

For example, in the machinists' line, Desmond-Simplex's exclusive steel slide has been proven unbreakable in service in industry.

Ten models and types of woodworking vises, strongly constructed for all school requirements. Also drill press and milling machine vises and utility vises in several sizes.

Write for copy of our new vise catalog and name of your nearest distributor.

Desmond-Simplex

THE COMPLETE LINE OF QUALITY VISES FOR SCHOOL SHOPS
THE DESMOND-STEPHAN MFG. CO., URBANA, OHIO

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Finest quality and the best colors in all new, flat, paper-masked Plexiglas. Sizes 6" x 12" and larger in the assortment. Dyes and cements available.

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#3 By J. H. Douglass & R. H. Roberts. Plans for 120 projects in the use of hand and power tools. The projects are helpfull in maintaining student interest while developing techniques, skills, good work habits, attitudes, and appreciations. Easily read and interpreted. Many photographs. $3.25

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FOR EASY PROJECTS YOUR STUDENTS CAN MAKE WITH **FIR PLYWOOD**

## CHRISTMAS DECORATIONS

**No. 1** includes complete plans for colorful display-decorations: Giant Santa • Angel and Choir Boys • Carolers • Christmas Tree • Sleigh and Reindeer • Others

## CHRISTMAS GIFTS & TOYS

**No. 2.** Complete plans for easy Christmas projects: Child's Desk • Toy Trailer • Doll House • TV Table • Cutting Board • Knife Rack • Others

## NATIVITY SCENE

**No. 3.** Wonderful group project. Plans for life-size cut-out figures for striking Manger display.

## 12 plans for KITCHEN FEATURES

4. Snack Bar 5. Snack Bar Overhead Cabinet 6. Cleaning Cart 7. Built-in Range Cabinet 8. Built-in Range Drawers 9. Laundry Cart 10. Canned Goods Closet 11. Kitchen Desk 12. Sink Cabinet 13. Mixing Center Counter 14. Sliding Spice Rack 15. Oven Utensil Cabinet

## 8 plans for BUILT-INS

16. Living Room Storage Wall 17. Sectional Storage Wall 18. Attic Storage Wall 19. Child's Storage Wall 20. Music Wall 21. Odds 'n Ends Cabinet 22. Shelf Door Wardrobe 23. Entry Closet

## 5 plans for FURNITURE

24. Buffet Chest 25. Stacking Cabinets 26. Storage Bed Headboard 27. Toy Storage Blocks 28. Workshop Bench

## 5 plans for OUTDOOR STORAGE

29. Patio Furniture 30. Child's Playhouse 31. Child's Sand Box 32. Garden Work Center 33. Outdoor Storage Wall

## 6 plans for BOATS

34. 8' Pram 35. 9' Skiff 36. 11½' Skiff 37. 13½' Outboard 38. 15' Sailboat 39. 20' Sloop

*Single copy of any plan free to industrial arts teachers. Order by plan number from Douglas Fir Plywood Association, Dept. 5, Tacoma, Wash.


# Shop Equipment News

## LOGAN 3-DRAWER CABINET LATHE

The 3-drawer steel cabinet base is again available on Logan 10- and 11-in. Swing Lathes, No. 1825 and No. 1925 respectively. Each drawer has an individual lock and provides handy storage space for tools and unfinished work. These lathe drawers enable the students to begin work promptly and devote a greater percentage of class time to actual lathe operation.

Logan Three Drawer Cabinet Lathe

*Logan Engineering Co., Lawrence and Lamon Ave., Chicago 30, Ill.*

**(For Convenience Circle Index Code 0801)**

## NEW EXTRA WIDE EXTRA LONG TWO-SCALE TAPE

To answer the increasing demand for a "Pull-Push" Rule with greater rigidity for unsupported overhead and horizontal measurements, Stanley Tools is now marketing an extra-wide (full ¼ in.) extra-long (10 ft.) tape with double-scale marking. No. 3610W

10 ft. Pull-Push No. 3610W Rule

"Pull-Push" rule is especially suited for quick measuring of plywood, insulating board, and other large size sheet material, horizontally or vertically, with less chance of blade buckling. Double scale saves time and error: (1) tape marking in inches and feet, and (2) continuous inches. Conversion to feet and inches, or vice versa simplified by the new "Tru-Reading" mouth. "D" shaped die-cast case has durable chromium plated finish. Add two inches for inside measurements. Flexible-rigid steel blade is replaceable, has "no-glare" white finish, bold graduations and numbers. "Tru-Zero" Hook compensates for its own thickness inside or outside; measurements start at absolute zero.

For further information write to *E. C. Benfield, Stanley Tools, New Britain, Conn.*

**(For Convenience Circle Index Code 0802)**

## SOUTH BEND 7-IN. PRECISION BENCH SHAPER

The 7-in. bench shaper recently announced by South Bend Lathe Works has a number of the following points to commend it: built-in accuracy and versatility for rapid machining on small parts; higher rate of operating speed; ease of setting up work; and low power consumption, built-in work light.

This versatile little shaper has a length of stroke from 0 to 7 in.; strokes per min. — 42, 75, 120, 195; power cross-feeds (reversible), .002 to .012 in.; tool slide feed at any angle, 3 in.; tool post accommodates ⅜ by 1 3/16 tool shanks; vise jaws open to 4 by 4 in. with a depth of 1 in.; table is 5 by 6 5/16 in., 5 7/8 in. deep; the horizontal table travel is 9½ in., and the vertical table travel is 5 in. The recommended motor size is ⅓ or ½ h.p. The shaper also has force-feed lubrication.

For further information write to *South Bend Lathe Works, 425 East Madison St., South Bend 22, Ind.*

**(For Convenience Circle Index Code 0803)**

## NEW ELECTRICAL KIT

Crow Electri-Craft Corporation has published a four-page bulletin titled the "Visual Experiment," which describes Crow Electri-Kit Model 41B for beginners designed to bring an understanding of electricity to the widest possible audience at the lowest possible cost.

Model 41B Electri-Kit is suitable for either individual self-instruction or for group instruction. It contains 115 parts for constructing over 100 operating assemblies plus a 240-page, fully illustrated text manual.

Copies of the new bulletin giving complete details about this beginners' Electri-Kit are available on request from *Crow Electri-Craft Corp., 1102 Shelby St., Vincennes, Ind.*

**(For Convenience Circle Index Code 0804)**

## NEW PRANG TEXTILE COLORS

The American Crayon Company is featuring for the first time their Prang Aqua Textile Colors, which have a number of qualities appealing to student, teacher, and craftworker.

The colors are easier to use; they are versatile; have no offensive odors; finished work is washfast and lightfast; and the colors are soft to touch.

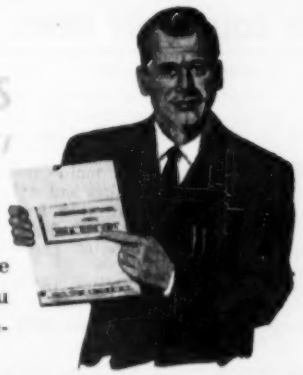
These textile colors are water base. You paint right from the jar. You thin (when necessary) with water, and you "clean up" with water.

The series comes in an excellent range of basic colors, assuring a complete palette from vivid hues to a multitude of grayed or subdued effects.

(Continued on page 42A)

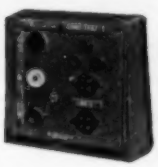
# Send For "Electrical Requirements for High School Electric Shops"

(INDUSTRIAL ARTS LEVEL)



You should have our Booklet No. 205, with the above title . . . *especially* if you are planning a new shop or re-vamping your present one. This booklet will give you valuable suggestions. It offers a shop layout plan and lists fundamental requirements. Fill in the coupon below for prompt attention by us.

## Safe, Timesaving, Up-to-the Minute Equipment

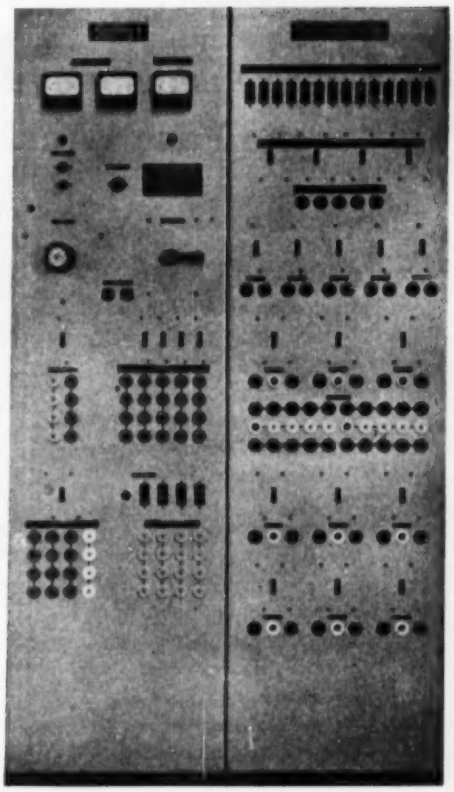


**SERVICE UNIT**

A typical bench unit for a 2- or 3-wire variable service, 120V a-c and a continuity test circuit. Single or double faced. Many other types available.

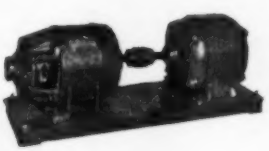
**DISTRIBUTION SWITCHBOARD**

This controls and distributes all the various a-c and d-c currents required for any work in the Electric Shop.



**CONNECTOR CORDS**

Other types furnished to meet requirements.



**MOTOR GENERATOR**

A typical machine for furnishing 125V d-c. Can be furnished in any size required.

**THE STANDARD ELECTRIC TIME COMPANY**

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Contemplating new Electric Shop ☐

Contemplating re-vamping present shop ☐

*Name* _____

*Title* _____

*School* _____

*City* _____ *State* _____

## SHOP EQUIPMENT NEWS

(Continued from page 40A)

They are offered in two kits with a special folder giving easy-to-follow directions and suggestions for the effective use of this new medium.

Also included are 5 sets of multi-colored stencils, 4 brushes in different sizes and styles, and a colorful brochure packed with freshly conceived ideas and stimulating suggestions illustrating the versatile range of practical projects possible with this kit.

For further information write to *The American Crayon Co., Sandusky, Ohio.*

**(For Convenience Circle Index Code 0805)**

### A NEW CABLE SPLICING METHOD

Factory-perfect cable splices under field conditions are made quickly and easily using a new splicing and insulating method introduced by Minnesota Mining and Manufacturing Co.

The new method involves embedding the splice in liquid epoxy resin that hardens into a hermetically sealed casting. No heat is required.

Used in convenient kit form, it allows the workman in the field to turn out a tough, plastic-jacketed splice in a matter of minutes, completely protected and insulated against moisture, corrosion, and electrical leakage.

For further information write to *Minnesota Mining and Manufacturing Co., St. Paul, Minn.*

**(For Convenience Circle Index Code 0806)**

### DIALING DEVICE FOR TAPER TURNING

Magna Engineering Corporation have perfected a helpful device for taper turning. The illustration shows a close-up of how the cup center is set over for taper turning a table leg. The calibrated eccentric mount may be

Dialing Device for Taper Turning

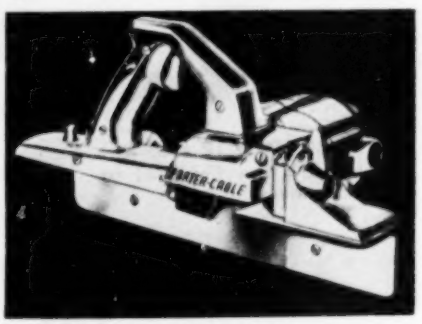
locked with an Allen screw for taper cuts up to 1 inch. It's one of many exclusive features of the new Shopsmith Mark 5, developed to make home woodworking easy for beginners, and a delight for experts.

For further information write to *Magna Engineering Corp., Menlo Park, Calif.*

**(For Convenience Circle Index Code 0807)**

### THE PORTA-PLANE MODEL 126

The Porter-Cable Machine Company recently announced a new heavy-duty electric plane with a cutting speed of 25,000 r.p.m. The Porta-Plane removes $\frac{35}{64}$ in. of wood at each stroke, producing a square, dead level, glass-smooth surface that needs no sanding.




Model 126 Porta-Plane

Tests show that it is ten times faster than a hand plane, cuts more accurately, and eliminates fatigue. The model is also more compact and lighter than similar planes. It weighs 9¼ lb., measures 16 in. long, and has a bevel adjustment that enables the plane to cut any angle from 45 deg. to minus 15 deg.

For further information write *Porter-Cable Machine Co., 36 Exchange St., Syracuse 8, N. Y.*

**(For Convenience Circle Index Code 0808)**

### "THE CENTURY" HOBBY WORKSHOP BY X-ACTO

"The Century," a complete hobby workshop — a tool chest, workbench, and storage cabinet combination with more than 150


**3 big reasons why DEK-TUFTS make Prize Winning projects!**

**1. Unlimited Use . . .** application of Dek-Tufts is limited only by extent of the imagination . . . and they're simple to apply . . . just hit the nail on the head and they attach to any wooden surface — round or flat.

**2. Lasting Beauty . . .** Dek-Tufts come in 8 vibrant colors to combine and contrast with any color scheme: forest green, lime, gray, red, ivory, beige, tuscan wine and black . . . rugged because they're made of lumarith acetate which is washable and non-inflammable and has the appearance of richly-colored tufted leather.

**3. Economical . . . AS A SPECIAL OFFER** Dek-Tufts may be purchased by schools at 6¢ per square. (Regular retail: 10¢ each.) A box of 50 threaded matching nails is only 25¢.

**FREE** . . . samples and literature are available. **WRITE NOW:**

**JAYDON, Inc. 482 Broome St., New York 13, N. Y.**

hobby tools -- has been introduced by X-Acto, Inc.

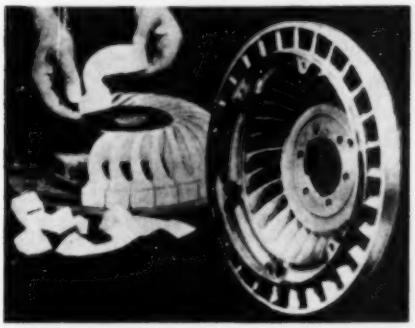
"The Century" is an attractive blond hardwood unit measuring 47¼ in. high, 27 in. wide, and 11¼ in. deep. Its built-in drawing board folds out to provide a 19 by 26-in. working surface which will put an end to gouged and scratched table tops resulting from the makeshift use of household furniture for hobby work. Accessible racks are the basis for the orderly and systematic housing of the tools. There are more than five cubic feet of extra storage space in the base and two roomy drawers are designed to take care of small parts. The unit contains every hobby hand tool in the X-Acto line.

For further information write to *X-Acto, Inc., 48-41 Van Dam St., Long Island City, N. Y.*

**(For Convenience Circle Index Code 0809)**

## IMPORTANT NEW PROCESS PERFECTED

With the perfection of the plaster casting process by Aluminum Company of America, an important new production method has been added to the Company's five foundries.



Alcoa's New Plaster Casting Process

The plaster process, first developed on a large scale by Alcoa as a core material for the intricate bladed castings used in automotive torque converters, is now employed in a wide variety of aluminum foundry applications.

*Aluminum Company of America, 735 Alcoa Bldg., Pittsburgh 19, Pa.*

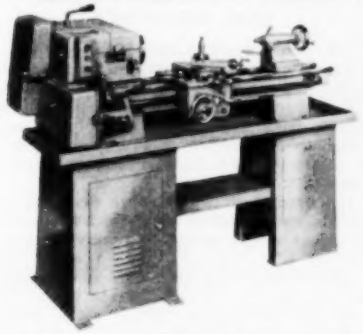
**(For Convenience Circle Index Code 0810)**

## THE NEW CLAUSING 5300 PRECISION LATHE

The Clausing 5300 is a new heavy-duty 12-in. precision lathe that is ideal for the school shop.

It has 1-in. collet capacity, a heavy-duty No. 3 MT tailstock with tang socket, 12-in. swing, 12 speeds, 9-in. cross slide travel, and 2¾-in. tool post travel.

It is ruggedly and accurately built for close tolerance work. It has a new, massive headstock and tailstock and a heavy-duty bed and carriage. The spindle turns on Timken "Zero-Precision" tapered roller bearings. The spindle is forged, precision ground steel with hardened nose. Both V ways and flat ways of bed are precision ground, and headstock, carriage, and tailstock are hand fitted to the bed.



Clausing 5300 Precision Lathe

All belts are fully guarded, and the controls are conveniently located on front of lathe. Headstock hood will not open unless clutch is disengaged, and clutch won't engage unless hood is closed.

Condensed specifications: 24, 36, and 48 in. between centers; 12¾-in. swing over bed, 8½-in. over saddle; thread range, 48 — 4 to 224 Standard, right or left.

For illustrated catalog, write to *Clausing Division, Atlas Press, 5374 N. Pitcher St., Kalamazoo, Mich.*

**(For Convenience Circle Index Code 0811)**

## SAJO HORIZONTAL MILLING MACHINE

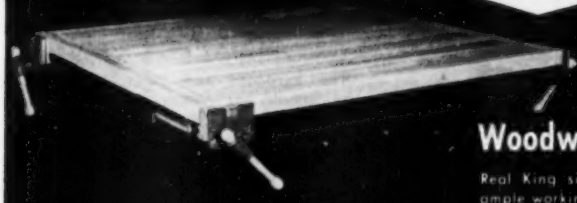
Austin Industrial Corporation announces that it has been appointed exclusive U. S. and Canadian Distributor for SAJO horizontal milling machines which are manufactured in Sweden.

SAJO horizontal milling machines are medium duty, high speed type, available in both plain and universal models. The one shown is a plain miller with power longitudinal, transverse and vertical feeds. The machines are of sturdy construction and meet the highest standards of accuracy. For example, guaranteed maximum spindle run out at the end of 12 in. mandrel is .0008 in. Accuracy test sheet accompanies each machine.

(Continued on next page)


Step Up Shop Efficiency By Doing More in Less Space with these . . .

2 B-G Wonder Workers



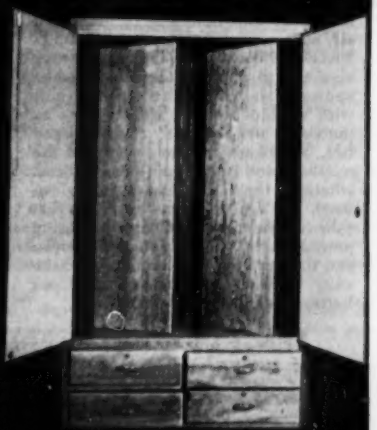
4 in 1 Woodworking Bench

Real King size — 64" x 54" — with ample working space for 4 students. Quality 2¼" solid maple top equipped with a strong 5 CD Columbia Vise on each corner. Vise ends reinforced with heavy 5" battens firmly bolted for solid foundation. Durable, heavy gauge metal base, olive green, is recessed to provide maximum work area with minimum floor space.

L 4 LOCKER TYPE — comes with 12 individual storage lockers, numbered and equipped for padlocks.

Tool Storage Cabinet with Revolving Tool Panels

This new B-G hardwood tool storage cabinet is the ideal answer to the ever increasing need for a compact unit with an abundance of separate spaces for the efficient storing of tools. The twin tool panels are mounted on separate fasteners, allowing a 360 degree circular turn — making both sides available for mounting tools. Heavy tools are mounted on back and both sides of cabinet interior. 4 drawers. Hardware and fasteners are heavy type. Entire unit can be master keyed.

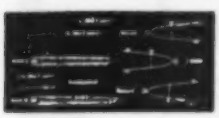


If you haven't received a copy of the new 1954-55 B-G Master Catalog, write for it today.

BRODHEAD GARRETT CO.

4560 E. 71 ST. CLEVELAND 5, OHIO

IMPORTED
VOCATIONAL DRAWING SET



No. 912 — 3 Bow,
10 Pc Drawing Set
Velvet Lined
2-Button Case
$6.00 Ea. $66.00 Dz.

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SEND FOR YOUR FREE
Hotpack
ELECTRIC
CERAMIC KILN
*FIRING LOG*

The ELECTRIC HOTPACK COMPANY offers a free copy of their kiln firing log. This chart can be used with all makes of kilns, not only HOTPACK QUALITY KILNS, and serves as a useful guide in determining the approximate firing time for your unit with various kinds of ware and as an indicator of element efficiency and life. The chart enables you to list the number and types of pieces fired, whether they are bisque or glaze fired, the time required to reach certain temperatures and the total firing period. After just a few firings you can then predict how long it will take your ware to mature and give you better, more accurate firings.

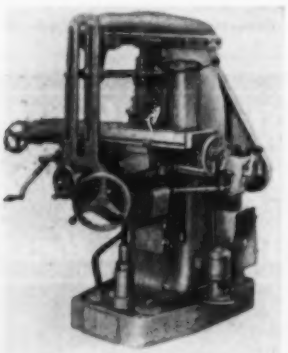
The ELECTRIC
Hotpack
COMPANY, Inc.
5067 Cottman Avenue
Philadelphia 35, Penna.

## SHOP EQUIPMENT NEWS

(Continued from previous page)

Table size for both plain and universal millers is 41½ by 9¼ in. Longitudinal power traverse is 24½ in. for the plain miller and 27½ in. for the universal miller. Transverse and vertical travel either by hand or power feed are respectively 8¼ in. (4½ in. with overarm braces in place) and 19 in.

Power is transmitted to the spindle from 3 h.p. motor mounted in the base of the column. Twelve spindle speeds from 36 to 1540 r.p.m. are available through pulleys and simple gear transmission.



SAJO Horizontal Milling Machine

The hardened and ground chrome-nickel steel spindle has American Standard No. 40 milling machine taper. Spindle is mounted in SKF precision roller bearings and is equipped with SKF thrust ballbearings. Machines are available with longitudinal power feed only or with power feed in longitudinal transverse or vertical directions. Twelve easily selected feed rates are available. All screws and dials are calibrated in inches.

Standard equipment supplied with either Plain or Universal models includes: 3 h.p. motor and starter equipment, motor driven coolant pump, 1 in. Style B arbor, overarm support braces.

For further information or literature please refer to: *Austin Industrial Corporation, 76 Mamaroneck Ave., White Plains, N. Y.*
R. Meier, Milwaukee, Wis.

**(For Convenience Circle Index Code 0812)**

### NEW EICO HIGH VOLTAGE PROBE

Eico (Electronic Instrument Company), makers of Eico kits and instruments, has announced production of the new mode HVP-2 High Voltage Probe. Designed for use with EICO and any VTVM or 20,000 ohms/volt Multimeters, it permits measurements up to 30,000 volts for TV servicing purposes, etc. It combines extra safety, new ease of handling, handsome professional appearance, and low cost.

Its new 6-way safety protection is accomplished by: (1) smooth, streamlined body prevents dangerous accumulations of dirt or moisture; (2) two large flashguards lengthen the leakage path; (3) the multiplier resistor is completely encased within the probe body; (4) the fully insulated grip prevents any metal touching the hand; (5) the probe tip features anti-corona construction; (6) the high voltage cable is covered with special protective insulation.

Eico High Voltage Probe

For further details, write directly to *Electronic Instrument Co., Inc., 84 Withers St., Brooklyn, N. Y.*

**(For Convenience Circle Index Code 0813)**

### VACUUM TUBE VOLTMETER

Electronic Instrument Company announces new peak-to-peak vacuum tube voltmeter in both kit and wired form.

Expressly designed for TV servicing, EICO's new Model 232 Peak-to-Peak VTVM offers a combination of precision and versatility features never before available at so low a price.

Vacuum Tube Voltmeter

The new Dual Purpose AC/DC Uni-Probe (Pat. Pend.) comes complete with either the kit or wired instrument and is a wonderful timesaver; this one probe performs all functions — a half-turn of the probe-tip selects d.c. or a.c.-ohms

Model 232 features an exceptionally stable push-pull triode bridge circuit, with accuracy unaffected by line voltage variation. It reads peak-to-peak voltage of complex and sine waveforms, rms voltage of sine waves, d.c. voltage, and resistance. Seven nonskip ranges on every function assure a uniform 3 to 1 scale ratio between adjacent ranges for extreme wide-range accuracy. It provides for center-scale zero adjustment for TV/FM alignment, and for calibration from outside the cabinet. Its large 4½-in. meter is electronically protected against burn-out.

For further information write to *Electronic Instrument Co., Inc., 84 Withers St., Brooklyn 11, N. Y.*

**(For Convenience Circle Index Code 0814)**

### MODEL 32000 FOLEY HAND SAW RETOOTHER

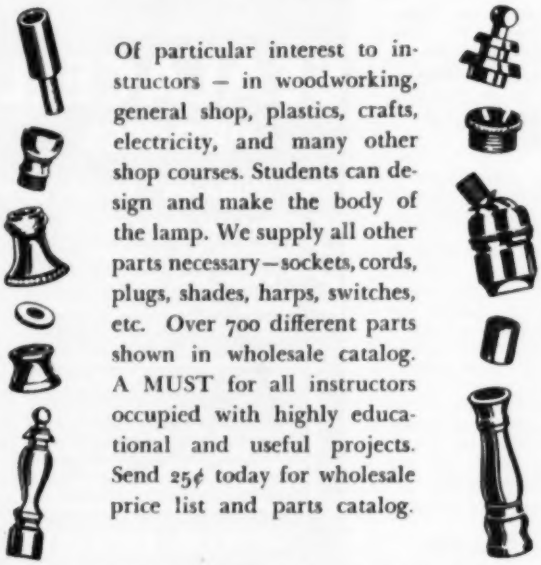
The new Model 32000 Foley Automatic Hand Saw Retoother restores any handsaw to like-new condition in a matter of minutes.

A *V*-shaped steel punch cuts away old irregular teeth and forms perfect new ones, either rip or crosscut, of any size from 4 to 16 points per inch. Saw handles need not be removed.

Important features include a dial indicator to insure any desired tooth pitch from 0 to 30 deg. and the ability to produce either a straight or a crowned toothed edge. Saws travel through Foley Retoother on the same carriers used by the manufacturer's saw filing machines, eliminating further setup adjustments.

(Continued on page 46A)

# EDUCATIONAL
## LAMP PROJECTS



Of particular interest to instructors — in woodworking, general shop, plastics, crafts, electricity, and many other shop courses. Students can design and make the body of the lamp. We supply all other parts necessary—sockets, cords, plugs, shades, harps, switches, etc. Over 700 different parts shown in wholesale catalog. A MUST for all instructors occupied with highly educational and useful projects. Send 25¢ today for wholesale price list and parts catalog.

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Oval S. Harrison
Presents creative experiences which lead to understanding mechanical drawing's principles and applications.
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6. **HOW TO READ ELECTRICAL BLUEPRINTS**
Heine-Dunlap-Jones
This elaborately illustrated revision provides the beginner with comprehensive training in reading electrical prints.
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Kennard C. Graham
Contents treat all types of industrial installations; contains a valuable section on estimating industrial wiring.
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Chicago 37, Illinois


## SHOP EQUIPMENT NEWS

(Continued from page 44A)

The Foley Retoother is furnished with choice of hand or motor drive. Hand drive can be converted to power drive at any time.

For full information write the *Foley Manufacturing Company, Department 58, 3300 Fifth Street, N.E., Minneapolis 18, Minn.*

**(For Convenience Circle Index Code 0815)**

### SCREENING OF "FREEDOM TO LEARN" SETS RECORD

The official premiere of "Freedom To Learn," new National Education Association film, set a record for big-screen projection of 16mm. motion pictures.

The 27½ minute, full-color NEA film of the year was projected more than 250 feet onto a screen 32 feet wide in the main arena of Madison Square Garden for a general assembly meeting of the 1954 NEA convention.

Screen magnification of the tiny 16mm. frame was more than 1000 diameters and the area of the screen image more than 1,000,000 times greater than the original picture on the film. The print, on Commercial Kodachrome Film, was projected on a regular Arc Model 25 16mm. Sound Projector, made by the *Eastman Kodak Co., Rochester 4, N. Y.*

**(For Convenience Circle Index Code 0816)**

### METALLIC WATER COLOR SET

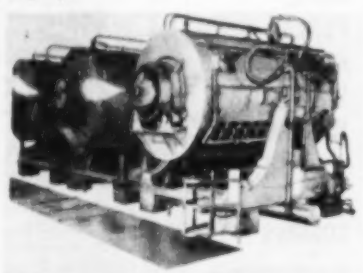
A new item in water colors has been made available by the F. Weber Company. It contains eight brilliant metallic water colors in metal half pans, assorted colors, and one good quality camel-hair pointed water-color brush, in hinged-lid metal box, rolled-edge construction.

For further information on Metallic Water Color Set No. 4/8-M, and other artists' and drawing materials, write to *F. Weber Co., P. O. Box 995, Philadelphia 5, Pa.*

**(For Convenience Circle Index Code 0817)**

### AGF ROTARY RETORT FURNACES

The AGF Rotary Retort Furnaces used for uniform carburizing of rollers and races are manufactured by the pioneer makers of industrial gas heat-treating furnaces, machines, and equipment — the American Gas Furnace Company.



AGF Rotary Retort Furnace

Further information on these furnaces is available upon application to *American Gas Furnace Co., 986 Lafayette St., Elizabeth, N. J.*

**(For Convenience Circle Index Code 0818)**

### TWIST DRILL APPLICATIONS CHART

Whitman & Barnes has recently published an interesting and useful chart, entitled *Twist Drill Applications.*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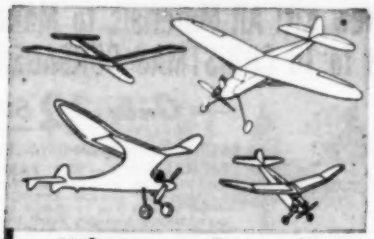

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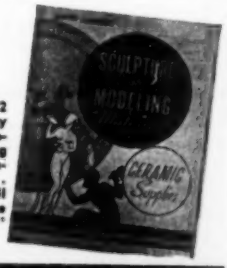


**STEWART CLAY CO., INC.**

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The chart gives recommendations as to the kind of drill to use in practically all types of metals and materials.

Also included on the chart are illustrations showing correct drill point angles to use, for best results in various materials. Proper speeds, feeds, and recommended oils and cutting compounds also are shown.

A copy of the chart can be obtained by writing to *Whitman & Barnes, Plymouth, Mich.*

**(For Convenience Circle Index Code 0819)**

## ELMER'S GLUE-ALL IN A HANDY PLASTIC CONTAINER

Elmer's Glue-All, a versatile polyvinyl resin glue for household use, is now being offered nationally in a handy plastic container with an easy-applicator top.

Glue-all is a white liquid adhesive which dries as a tough, colorless film. It is designed for a wide variety of household repair jobs as well as for all types of handicraft. It is available in a 1¼-oz. squeeze bottle at the present time, and larger glass containers, and the adhesive will later be packaged in four- and eight-ounce squeeze bottles. It is on sale in most retail stores across the country.

*Borden's, 350 Madison Ave., New York 17, N. Y.*

**(For Convenience Circle Index Code 0820)**

## THE NEW WHITEHALL TYPE FACE

A modern roman type face, called Whitehall, has been introduced by American Type Founders. Whitehall is a general purpose type face suitable for either display work or hand set text matter. It is especially good for offset reproduction.

Specimen sheets and fonts of available sizes of Whitehall may be obtained from branches of American Type Founders throughout the country, or from: Frank Gerhart, advertising and sales promotion manager, *American Type Founders, 200 Elmora Avenue, Elizabeth B, N. J.*

**(For Convenience Circle Index Code 0821)**

## NEW 24-WATT HIGH-FIDELITY AMPLIFIER

Allied Radio Corporation announces the release of a new 24-Watt High-Fidelity Amplifier, the "Golden Knight." Although moderately priced, this amplifier includes an array of important features that add up to outstanding, high-fidelity music reproduction.

For additional details, including complete specifications and response curves, write to *Allied Radio Corporation, 100 N. Western Ave., Chicago 80, Ill.*

**(For Convenience Circle Index Code 0822)**

## NEW METHOD SIMPLIFIES WELDING

A new method of welding that eliminates skills normally required, promises to make it possible for the rapidly growing number of home fix-it-yourself and hobby craftsmen to work with metals as readily as with wood. It is expected that the method will also be useful to business and service establishments that occasionally need a quick, easy method of repair or maintenance fabrication.

This new method, called *Selfweld*, employs a special welding electrode and special electrode holder which automatically makes the weld itself.

This new 100-ampere welding machine is called the Lincwelder 100. It can be operated safely on the properly fused electrical circuit of the average home or business establishment, either 115 or 230 volts.

For further information write to *The Lincoln Electric Co., Cleveland 17, Ohio.*

**(For Convenience Circle Index Code 0823)**

**NEW PROJECT BOOKS**

**MAKING THINGS OF PLASTIC**

**This fine book, just published, is ideally suited for use in the school shop, giving step-by-step procedures in plastic work. Includes the exciting NEW development in this field — the *two-ply* or *laminating* process.**

**Numerous project suggestions and plans include pen stands, picture frames, bookends, cuff links, key rings, bracelets, small furniture pieces, and a wide variety of other attractive and useful articles. All processes are thoroughly described . . . laminating other materials into Plexiglas . . . cutting, molding and engraving . . . selecting materials, colors and designs. Plentifully illustrated with photographs and accurate drawings. Contains complete bills of material and lists of tools. COMPACT in size . . . HANDY to use.**

By L. Edwards. 192 pages. Book No. 1 in coupon ..... $3.75

**THE ART OF WOODTURNING**

**Long a leader in the field of woodworking, this book has now been REVISED and ENLARGED to provide the latest material on the subject while retaining the best of the old. Simple, definite instructions are given for every operation in lathe work, from spindle turning to faceplate work. Methods and details illustrated with a large number of photographs and drawings. 70 projects.**

By W. Klenke. 122 page. Book No. 2 in coupon ..... $3.85

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## Descriptive Material

### NEW LOGAN CATALOG

The Logan Engineering Company has published a new catalog describing and illustrating their full line of screw cutting and turret lathes, shapers, and accessories for school shops.

For your copy write to *Logan Engineering Co., Lawrence and Lamon Ave., Chicago 30, Ill.*

**(For Convenience Circle Index Code 0824)**

### NEW POWERMASTER BULLETIN DESCRIBES 15–100 H.P. PACKAGED AUTOMATIC BOILER LINE

An 8-page bulletin has just been published by Orr & Sembower, Inc., Reading, Pa., on a new line of simplified Powermaster packaged automatic boilers for firing light oil or gas.

The oil-firing equipment is a simplified mechanical pressure atomizing burner. For gas firing a specially designed premixing gas burner is utilized. Combination units adaptable to firing either gas or oil may be obtained. The new unit is built in nine sizes from 15 horsepower through 100 horsepower thus covering steam requirements to about 3450 lb/hr as well as hot water designs.

The Powermaster is a 3-pass boiler with a single flue gas flow reversal at either end. A minimum of 5 square feet of heating surface is provided per boiler horsepower.

For further information write *Orr & Sembower, Inc., Morgantown Road, Reading, Pa.*, for Bulletin 1230.

**(For Convenience Circle Index Code 0825)**

### THE TRIG-PAL CHART

Heller Engineering & Manufacturing Company has released a chart containing equations for any trigonometrical shape. The chart is called Trig-Pal.

It is 17 by 22 in. in size for convenient hanging on the wall, and is plastic coated so it may be kept clean. The chart itself shows the equations to learn the unknown factor when other factors are known. It operates for right angle trig., oblique angle trig., compound trig., and spherical trig.

For further information write to *Heller Engineering and Mfg. Co., 11750 Alameda St., Lynwood, Calif.*

**(For Convenience Circle Index Code 0826)**

### NEW GRAMERCY IMPORT COMPANY CATALOG

This new catalog gives a complete illustrated story of the drawing instruments imported and developed by this firm.

Many of the sets of drawing instruments illustrated have been specially put together at the request of schools who are engaged in teaching draftsmen for specific jobs.

A perusal of this interesting booklet will show many of these specially adapted sets, and will also show how these instruments are manufactured by highly skilled mechanics according to old-world methods.

For a copy of "Operation Craftsmanship," write to *Gramercy Import Co., Inc., 6 State St., New York 4, N. Y.*

**(For Convenience Circle Index Code 0827)**


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# *Business and Personal News*

## APPOINTED DISTRICT MANAGER

Clifford R. Boeckler has just been appointed district manager of the new Western New York Territory office of Niagara Machine & Tool Works, Buffalo. The company manufactures the nation's most complete line of presses, press brakes, shears, machines, and tools for plate and sheet-metal work.

The new sales office, headed by Mr. Boeckler, is located in the firm's plant at 683 Northland Ave., Buffalo, N. Y., and will serve Niagara and Erie Counties in New York and Erie County in Pennsylvania.

## NEW HOME FOR DITTO, INC.

Ground will be broken for the new $3,250,000 home of Ditto, Inc. The big building will be erected on a 27-acre site in Lincolnwood, Ill., a suburb adjacent to Chicago's North Side. It will cover 290,000 square feet of space and contain 310,000 square feet of floor space. The main section, housing manufacturing, engineering, and other production operations, will be 760 feet long, 360 feet wide, and one story in height. Executive, administrative, sales, purchasing, and other offices will be housed in the two-story section in the front and center.

## APPOINTED MACHINE TOOL SALES ENGINEER

Edgar N. Mather has been named Machine Tool Sales Engineer for the Lipe-Rollway Corporation's midwest and east-central sales areas. This sales territory comprises an area running westward from Erie, Pa., to the Mississippi River and south to Louisville, Ky.

## ATKINS SAW APPOINTMENTS

The following appointments, effective at once, have been announced by the Atkins Saw Division, Borg-Warner Corp., Indianapolis, Ind.

B. L. Owens has been advanced to sales manager of the division. Mr. Owens has been connected with Atkins for 32 years; his previous position was director of marketing.

M. A. Bauer, formerly manager of the contract department and an Atkins employee for the past 15 years, has been made assistant sales manager.

M. A. Straub, who recently joined Atkins, has been appointed assistant sales manager in charge of advertising and sales promotion.

## CHESTER H. LANG HONORED

Chester H. Lang, General Electric Company vice-president of public relations, and long active in Schenectady civic affairs, was the recipient of an honorary doctor of law degree by Union College at its Commencement on June 13, 1954.

## R. K. LeBLOND'S NEW ADVERTISING MANAGER

R. J. Reif has been appointed advertising manager of the R. K. LeBlond Machine Tool Company, Cincinnati, Ohio.

Mr. Reif was formerly assistant advertising

(Continued on next page)

SOCK— without SHOCK

The black head with the red handle— exclusively PLUMB

You hit with fullest force because *all* the metal is in the head of this tool.

That's SOCK— fast, power-packed blows.

It's SHOCK-PROOF — tiring shocks won't reach your arm. They're absorbed by the resilient handle, made of tested second growth hickory.

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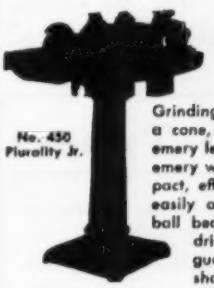

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No. 425 Plurality Sub Jr.
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Grinding can be done on a cone, coarse or fine or emery leather stropping or emery wheels. Unit is compact, efficient, serviceable, easily accessible and has ball bearing direct motor drive. Especially guarded for school shop use. Details on request.

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## BUSINESS AND PERSONAL

(Continued from previous page)

manager of the National Machinery Company, Tiffin, Ohio, and the Herbrand Tool Company, Fremont, Ohio, respectively.

### ROY E. HEFFNER NAMED DISTRICT SALES MANAGER

Roy E. Heffner has been named a district sales manager for DeWalt, Inc., maker of a line of woodworking machinery, and a subsidiary of American Machinery & Foundry Company.

Mr. Heffner's territory will include the states of Maine, New Hampshire, Vermont, Rhode Island, and Massachusetts.

### CHICAGO OFFICE CHANGED BY SURFACE COMBUSTION CORPORATION

Surface Combustion Corporation of Toledo, Ohio, announces the moving of their Chicago Industrial Furnace Division office from Room 1270, 122 So. Michigan, to Park Ridge Federal Bank Building, 116 So. Prospect in Park Ridge, Ill. Effective date was April 26.

Personnel involved in the change are W. O. Owen, District Manager, H. J. Gregg, C. E. Newman, W. M. Dempster, and R. Daley.

Increased man power to better serve the metropolitan area has made this move to larger quarters necessary.

### AMERICAN TYPE FOUNDERS PROMOTES FISHER AND TOBIAS

William W. Fisher has been appointed vice-president in charge of operations for American Type Founders, Inc., Elizabeth, N. J., while Robert A. Tobias becomes vice-president in charge of sales.

In his new position Mr. Fisher is responsible for American Type Founders' research program as well as the engineering and manufacturing activities at the company's Elizabeth plant. In addition, he will give functional direction to engineering and manufacturing at the new American Type Founders' plant in Mt. Vernon, N. Y. Mr. Fisher will also assist Mr. Edgar, executive vice-president of the firm, in the general conduct of American Type Founders' business.

### THE NEW CINCINNATI WHITEWATER SHOP

The Cincinnati Shaper Company has erected a new shop building 650 ft. long by 160 ft. wide. It is equipped with two 50-ton cranes on the high rail and two 10-ton cranes on the low rail. Another 25-ton overhead yard crane has a runway of 200 ft. The new shop is located west of Cincinnati on the New York Central Railroad and is on a tract of approximately 250 acres. Ultimately a large machine shop and an office building will be added to complete the consolidation of manufacturing facilities.

The first machine manufactured at this new Whitewater Shop was shipped recently.

### RAYMOND C. JONES NAMED DISTRICT SALES MANAGER

Raymond C. Jones has been named a district sales manager for DeWalt Inc., Lancaster, Pa. His territory includes the state of Arkansas, southern half of Illinois, southwestern portion of Kentucky, northern half of Mississippi, southeastern portion of Missouri, and Tennessee.

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is practical and economical for school shop and home use. Teach the boys what good glue can do by heating it in Sta-Warm electric glue pots. Cap. 1 to 12 qts. 110 V. A.C. Safe non-burning electric heat. Removable insert with ball brush-wiper, and lid if desired. Specify Sta-Warm glue melters.

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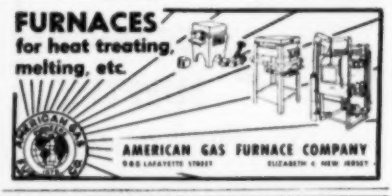


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| 104 | 1014 | 1024 | 1034 | 1044 | 1053 | 1062 | 1071 | 1080 | 1089 | 1098 | 10107 |
| 105 | 1015 | 1025 | 1035 | 1045 | 1054 | 1063 | 1072 | 1081 | 1090 | 1099 | 10108 |
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| 103 | 1013 | 1023 | 1033 | 1043 | 1052 | 1061 | 1070 | 1079 | 1088 | 1097 | 10106 |
| 104 | 1014 | 1024 | 1034 | 1044 | 1053 | 1062 | 1071 | 1080 | 1089 | 1098 | 10107 |
| 105 | 1015 | 1025 | 1035 | 1045 | 1054 | 1063 | 1072 | 1081 | 1090 | 1099 | 10108 |
| 106 | 1016 | 1026 | 1036 | 1046 | 1055 | 1064 | 1073 | 1082 | 1091 | 10100 | 10109 |
| 107 | 1017 | 1027 | 1037 | 1047 | 1056 | 1065 | 1074 | 1083 | 1092 | 10101 | 10110 |
| 108 | 1018 | 1028 | 1038 | 1048 | 1057 | 1066 | 1075 | 1084 | 1093 | 10102 | 10111 |
| 109 | 1019 | 1029 | 1039 | | | | | | | |

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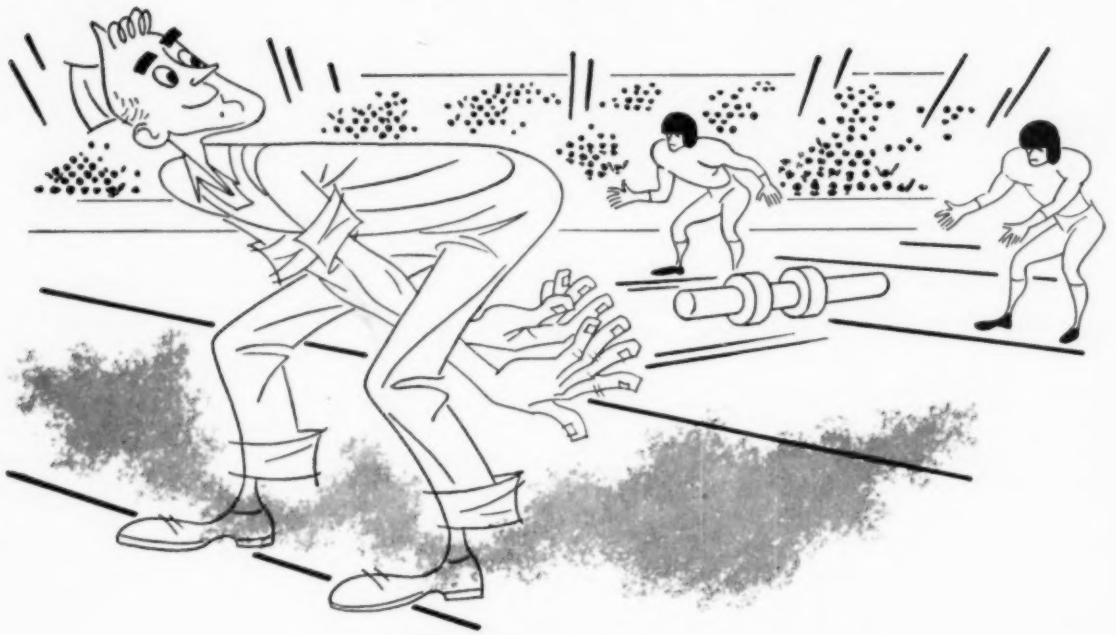
# Turning Terminology

## (as visualized by Tom the Trainee)



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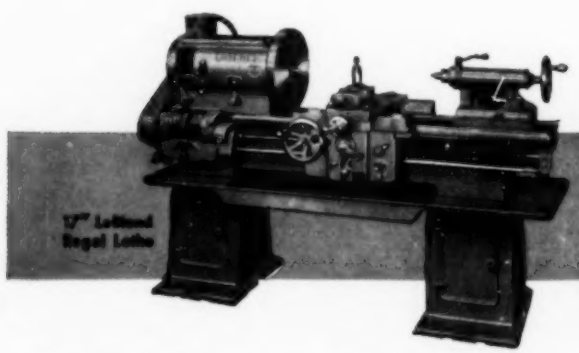


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